INDUSTRIAL ARTS
and
VOCATIONAL EDUCATION

The Shop Teachers' Professional Magazine

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Fluorine is a gas so violent in its reaction to its environment that it burns water. Even at 400 degrees below zero, fluorine and hydrogen explode on contact. Glass, steel, asbestos burn at touch. This avidity, a cause of disaster when uncontrolled, becomes fluorine's great advantage when put to useful work. For now science has tamed fluorine, made it tractable and useful. The plastic, dye, oil and other industries have benefited greatly. Man has many valuable new products because of this taming.

Human energy is often so violent in its reaction to its environment that, undisciplined, it produces the misfits that are a debit upon instead of a credit to society . . . or the rebels and the destroyers of civilization. The task of taming human energy has always been mankind's great problem and is the *fundamental* problem of education today. To be sure, the educator must teach his "subject". To be sure, the student must "pass". But if this is all, this is failure.

How then shall energy be mobilized toward worthwhile goals? How shall ambition for an honorable career and honorable achievement be aroused and strengthened? How can sound standards be established? Only the constant alertness of the educator can find the answers to these questions. Such alertness must extend to every point in the curriculum. The very drawing instruments a boy uses in mechanical drafting are a case in point. These are the instruments used by engineers whose exploits can fire the imagination and stir the desire to emulate in every mechanically minded lad . . . especially if the boy, at the threshold of manhood, has the inspiration of tools worthy of grown men. Their selection is an initial step on the road that leads to adult achievement. Here, too, "Well begun is half done". All men respond to fine workmanship. Shall the quality of the student's equipment be less than enough to win his respect? The human mind moves by analogy, from small to great, from near to far. In what direction shall these near, "small" steps lead? *Any educator who weighs these questions knows that to let a boy work with any but the finest equipment he can afford is to contradict all that the educator has learned about the fundamental educational process.*

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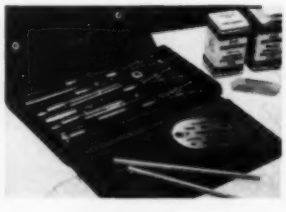

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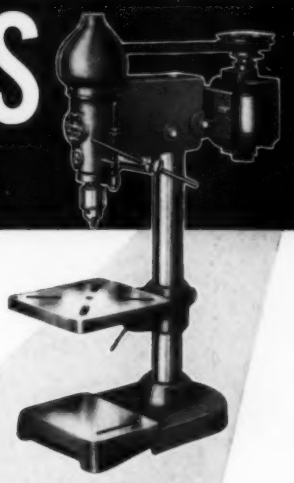
3 BASIC TOOLS
FOR BETTER TRAINING



The right equipment can contribute much to the effectiveness of machine shop training. South Bend Lathes, Drill Presses and Shapers are outstanding examples of this. As they represent basic tools of industry, they are essential in any school shop. They also make training easier and faster. Their simplicity of design promotes an ease of operation that speeds up the learning of machine handling and reduces the amount of supervision required. And, they are built as foolproof and rugged as possible to withstand hard usage from inexperienced operators.

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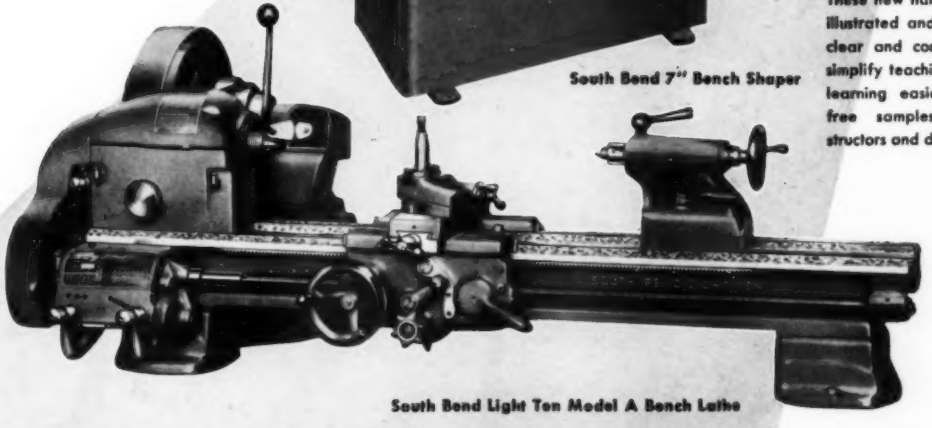

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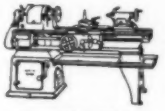
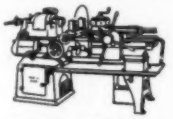
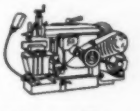


☐ 10" to 16-24" FLOOR LATHES



☐ ½" and 1" Collet TURRET LATHES

☐ 14" DRILL PRESSES



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Vol. 41 No. 5

MAY, 1952

INDUSTRIAL ARTS *and* VOCATIONAL EDUCATION

THE SHOP TEACHERS' PROFESSIONAL MAGAZINE

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This Month's Cover

The cover picture for the May, 1952, issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION shows how the student at the high school level can get elementary yet realistic experiences in flying an airplane. It is true he will not get the exhilaration of flying up into the air and through the clouds, nor will he fly to distant places, but he learns much about the work of the pilot and of those who navigate the air.

Harry A. Goldstein, instructor of photography at the Tucson high School, Tucson, Ariz., sent the photograph which one of his students, Renie Bardeau had made, to INDUSTRIAL ARTS AND VOCATIONAL EDUCATION.

★ ★ ★ ★

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Articles Indexed. — The articles contained in the Magazine are regularly indexed in "The Readers' Guide to Periodical Literature," and "Education Index."

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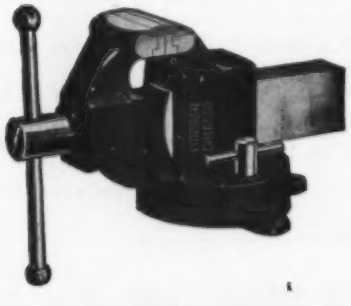

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ASSOCIATION NEWS

COMING CONVENTIONS

Apr. 30–May 3. **American Industrial Arts Association,** at Congress Hotel, Chicago, Ill. Secretary, D. Arthur Bricker, 216 E. 9th St., Cincinnati 2, Ohio.

May 9–10. **Wisconsin Association for Vocational and Adult Education,** at Lorraine Hotel, Madison, Wis. Secretary, C. D. Rejahl, 211 N. Carroll St., Madison, Wis.

May 12. **National Council of Technical Schools,** at Edgewater Beach Hotel, Chicago, Ill. Secretary, Leslie G. Morrey, 2000 S. Michigan, Chicago, Ill.

June 9–10. **Georgia Vocational Association,** at Municipal Auditorium, Savannah, Ga. Secretary, R. E. Hagen, 232 Pryor St., S.W., Atlanta, Ga.

June 18–20. **Pennsylvania Vocational Association,** at Forest Inn, Eagles Mere, Pa. Chairman, Ralph O. Grallington, 304 Burrowes Bldg., State College, Pa.

June 29–July 2. **International Graphic Arts Education Association,** at Lorraine Hotel and Madison Vocational and Adult School, Madison, Wis. Secretary, Fred J. Hartman, 719 — 15th St. N. W., Washington, D. C.

June 30–July 5. **National Education Association,** at Detroit, Mich. Secretary, Willard E. Givens, 1201 — 16th St., N.W., Washington 6, D. C.

SUPERVISORS HOLD INDUSTRIAL ARTS WORKSHOP

A workshop for administrators and supervisors of industrial arts programs in the United States and Canada will be held in Chicago at the Congress Hotel on April 29 and 30 under the direction of Dr. Earl C. Kelley of Wayne University. Dr. Kelley is well known throughout the country for his publications on workshop techniques and his leadership in workshop groups.

The two-day program will get under way at ten o'clock on Tuesday morning, the twenty-ninth, with a preliminary session to establish the pattern of the conference. It will close late Wednesday afternoon with most of the time having been devoted to work sessions.

The workshop is sponsored by the American Council of Industrial Arts Supervisors as its part of the convention program of the American Industrial Arts Association. A cordial welcome is also extended to teachers and teacher education staffs of industrial arts. — *Merrill C. Hamburg.*

THE OSWEGO SPRING CONFERENCE

One of the highlights of the Annual Industrial Arts Spring Conference has always been the Thursday evening banquet and an address by some prominent educator in the field of industrial arts. This year Oswego has been fortunate in being able to bring Dr. John L. Feirer, Head of Industrial Arts Department, Western Michigan College, to give the banquet address. The subject of Dr. Feirer's talk will be "Industrial Arts Today: The Implications of Physical Facilities in the Growth of Industrial Arts."

Dr. Feirer is well qualified to discuss this pertinent topic. His sixteen years of teaching, coupled with degrees from Stout Institute, the University of Minnesota, and the doctorate from the University of Oklahoma are ample evidence of practical experience and academic preparation. He is the author of magazine articles and has written books on metal work, electricity, woodworking, and machine shop practice. An active member of many professional organizations, he has served on committees for the American Vocational Association, the American Industrial Arts Association, and the United States Office of Education. In addition to these, he has given addresses at American Industrial Arts Association conventions and read papers at the Mississippi Valley Industrial Arts Conference. Dr. Feirer is

(Continued on page 6A)

Educators From Other Countries

These educators attended Pennsylvania State College during the fall semester of the school year 1951–52.
Seated from left to right are: Harold Andersen, Norway; Louis K. Cantave, Haiti; Ole N. Lund, Norway; Felizardo S. Camilon, Philippines; Teresita Trejos, Costa Rica; and Farhand H. Rad, Iran.
Standing from left to right are: Richard N. Peterson, San Diego, Calif., graduate assistant at the College; Sami Bilgin, Turkey; Hans Kloth and Hans-Peter Klose, both of Germany; Carl R. Backlund, Finland; Dr. S. Lewis Land, director of vocational-teacher education at the College; Elias M. Caray, Philippines; U. L. Nayak, India; Isias G. Gervasio, Philoppines; and Phanom Smitananda, Thailand.

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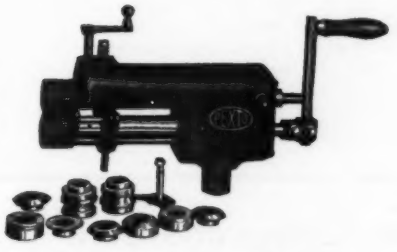
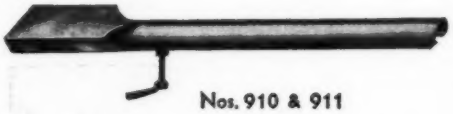


Combination Rotary Machines



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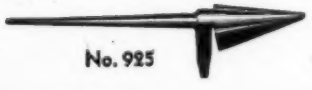

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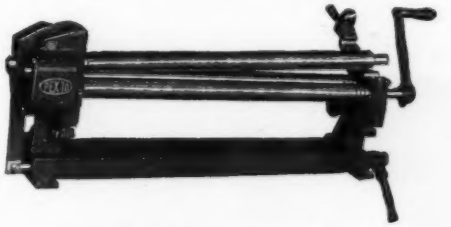
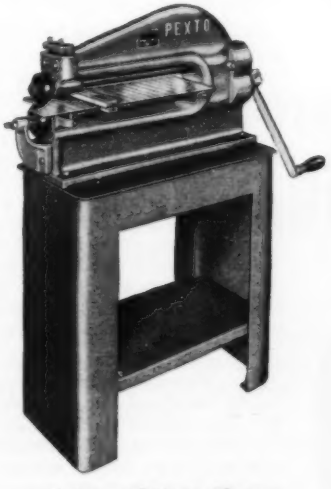
Stakes



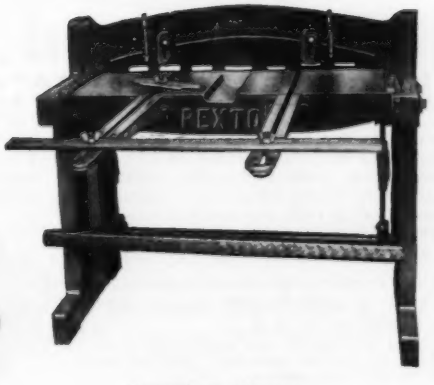
Forming Machines

Bar Folders



Rotary Slitting Shears

Rotary Machines



Squaring Shears

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ASSOCIATION NEWS

(Continued from page 4A)

a member of Epsilon Pi Tau and has won the coveted Eichelberger Scholarship in Industrial Arts at Stout Institute on two occasions.

On Friday morning, the principal speaker will be J. Wesley Ketcham, Educational Consultant for the National Association of Manufacturers. Mr. Ketcham has for the past year been on leave from the State Office of Education of Connecticut where he was Superintendent of Industrial Arts. He has had extensive experience in the field of education as teacher and administrator and his work with the N.A.M. over the past years makes him well qualified to discuss the topic of "A Challenge to Industrial Arts Teachers."

The Oswego Conference this year will mark the opening of the new million dollar extension to the Industrial Arts Building, and it is hoped that many teachers and administrators will avail themselves of the opportunity to inspect the new facilities in addition to meeting and hearing Dr. Feirer and Mr. Ketcham. — *Dr. Gordon P. Wilber.*

CENTRAL MISSOURI INDUSTRIAL EDUCATION ROUNDUP

The annual Industrial Education Roundup of the Central Missouri State College District was held at Warrensburg, Mo., on Saturday, February 23, 1952. The meeting is an informal get-together that is now in its fifteenth year, and which, from the beginning, included such features as round-table discussions, displays of projects and demonstrations of skill by teachers of the district. C. S. Robinson, assistant superintendent of schools in charge of personnel, Kansas City, was the luncheon speaker. It is of interest that principals and superintendents participate in these programs, which included discussions of the school shop and the community, projects, demonstrations, and the teaching of skills.

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Personal News

ALPHA ALPHA CHAPTER OF E.P.T. HONORS DR. HANKAMMER

Dr. O. A. Hankammer, head of the industrial education and art department of Kansas State Teachers College, Pittsburg, Kans., was honored at a special meeting of the Alpha Alpha Chapter of Epsilon Pi Tau at Pittsburg, Thursday, February 28, 1952.

Dr. O. A. Hankammer

Dr. Hankammer, who has just completed his thirtieth year as a staff member and department head, was introduced by Professor Harry Hartman and presented with an inscribed desk set and anniversary cake. The cake was cut by Mrs. Hankammer and refreshments were served to the group of thirty members of the local chapter.

In the past thirty years Dr. Hankammer has received national recognition as a leader in industrial-arts education. He has been awarded two Laureate memberships in Epsilon Pi Tau. He is a past vice-president of the American Industrial Arts Association and is active in the American Vocational Association besides being affiliated with numerous other professional organizations.

♦ Dr. William F. Rasche, director of the Milwaukee Vocational and Adult Schools, Milwaukee, Wis., was honored at a reception on February 29, 1952, in observance of his twenty-fifth anniversary as director of the school. As part of the program Dr. Rasche was presented with a portrait of himself.

♦ Dr. Melvin S. Lewis, professor of guidance and vocational education, Indiana University, was recently honored by a group composed of his present candidates for the doctoral degree and those individuals who had previously earned that degree with him. He was presented with a bound

(Continued on page 8A)

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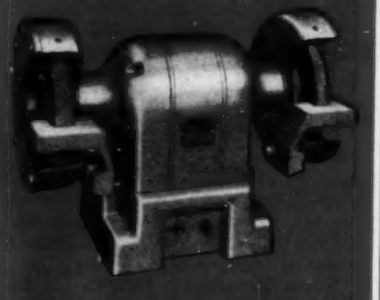

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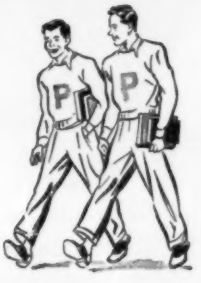

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PERSONAL NEWS

(Continued from page 6A)

volume of letters from those persons making up this particular group. Nearly one hundred individuals responded with letters and the results were a splendid tribute to Dr. Lewis both as an educational leader and as a teacher possessing a warm personal interest in students as individuals.

The presentation of the red leather bound volume, together with a check representing contributions from the various respondents, was made to Dr. Lewis during Christmas week at his home.

♦ Dr. Shriver L. Coover, director of the industrial arts department at the State Teachers College, California, Pa., will be a guest professor this summer at the North Carolina State College at Raleigh, N. C.

♦ Dr. Ralph G. Owens has been named dean of engineering at Illinois Institute of Technology.

Dr. Owens has served as assistant dean of engineering since February, 1951. He replaces Dr. Rettaliata who was recently named president.

From 1946 to 1951, Owens was professor of mechanical engineering at Illinois Tech.

He is a native of Eaton, Ohio, received his bachelor's degree in electrical engineering in 1927, and his masters' degree in 1928 from Ohio State University. He received his doctorate in 1939 at the University of Michigan.

Owens was an instructor at West Virginia University from 1928 to 1930, at Western Reserve University from 1930 to 1937, and at Wayne University from 1938 to 1941.

From 1941 to 1943 he was assistant professor at Colorado School of Mines, and in February, 1943, was appointed associate professor and department head there.

In June, 1943, he joined Armour Research Foundation of Illinois Tech as supervisor of thermodynamics and remained there until 1946.

Owens is a member of the American Association for Advancement of Science, American Society of Mechanical Engineers, American Society of Refrigeration Engineers, American Society for Engineering Education, Sigma Xi, and the American Physical Society.

♦ Dr. DeWitt T. Hunt, of Oklahoma A. & M. College, Stillwater, has for several years been contributing to *Ranch and Farm World* a series of articles on "safety," in pursuit of what he calls his "hobby," constituting a study of the prevention of "nonautomobile accidents."

In the December, 1951, issue of this monthly magazine, published in Tulsa, Okla., the editor reports that for the second consecutive year the *Ranch and Farm World* received the Public Interest Award for Exceptional Service to Farm Safety, announced by the National Safety Council. The award was made at a luncheon of the American Agricultural Editors' Association in Chicago, in November, during the week of the International Livestock Exposition.

Dr. Hunt has been in charge of the department of industrial arts at Oklahoma A. & M. College since 1915. His present title is Head of the School of Industrial Arts Education and Engineering Shopwork.

♦ H. M. Winkel, a Wisconsin school teacher since 1899, died recently in Milwaukee.

Mr. Winkel taught at Knellsville, Wis., for about nine years. He then established the commercial department at Milwaukee Vocational School. He retired in 1941. He is survived by his wife, Theresa, and a son.

♦ Herb Heilig, co-ordinator of vocational education for the department of psychology and education at Colorado A. & M. College, Fort Collins, has been granted a year's leave of absence, effective March 1, to accept an appointment with the United Nations Educational, Scientific and Cultural Organization.

He will be assigned to the government of Haiti to act in an advisory capacity to the minister of education and other cabinet officers in planning vocational training programs.

♦ Edwin K. Ford, director of vocational education for Nova Scotia, is on a one-year mission as adviser to the Iraqi Ministry of Education. He will assist the Ministry in its expansion of vocational school facilities and survey existing needs.

♦ Harry E. Davis has been appointed assistant director of the Alabama State Vocational Trade School at Dothan. Mr. Davis is a former cabinet and woodshop instructor.

♦ Dr. Stuart Anderson, associate professor of education at The Stout Institute, Menomonie, Wis., has accepted a position in Lima, Peru, where he will serve as director for the industrial education phase of the co-operative education program sponsored jointly by the Institute of Inter-American Affairs and the Peruvian Ministry of Education.

♦ Lloyd H. Donnell has been appointed acting chairman of the department of mechanics at Illinois Institute of Technology for one year in the absence of William R. Osgood.

Osgood is on a year's leave of absence to edit a monograph on residual stresses in metals and metal structures for the National Research council in Washington, D. C.

(Continued on page 28A)

SHELDON
CHICAGO U. S. A.

These 3 quality machine tools are especially adapted to school use because of their:

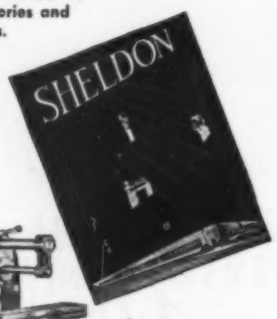
AMPLE SIZE — permits wide range of practical projects.

STANDARD DESIGN — true industrial tools with standard controls.

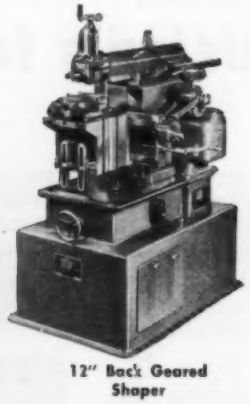
PERMANENT ACCURACY — these tools hold their accuracy under student abuse, do not require constant rebuilding and servicing.

SAFETY — all drives completely enclosed; all speed changes made by external levers.

PRICE — these are moderate priced tools that school shops can afford.

Write for the SHELDON Catalog showing and describing (with complete specifications) the line of: SHELDON Precision Lathes (9", 10", 11", and 13" Swing), Sheldon Milling Machines, Sheldon Shapers and Sheldon Machine Tool accessories and attachments.

Horizontal Milling Machine

No. T556B 11¼" Swing Lathe


12" Back Geared Shaper

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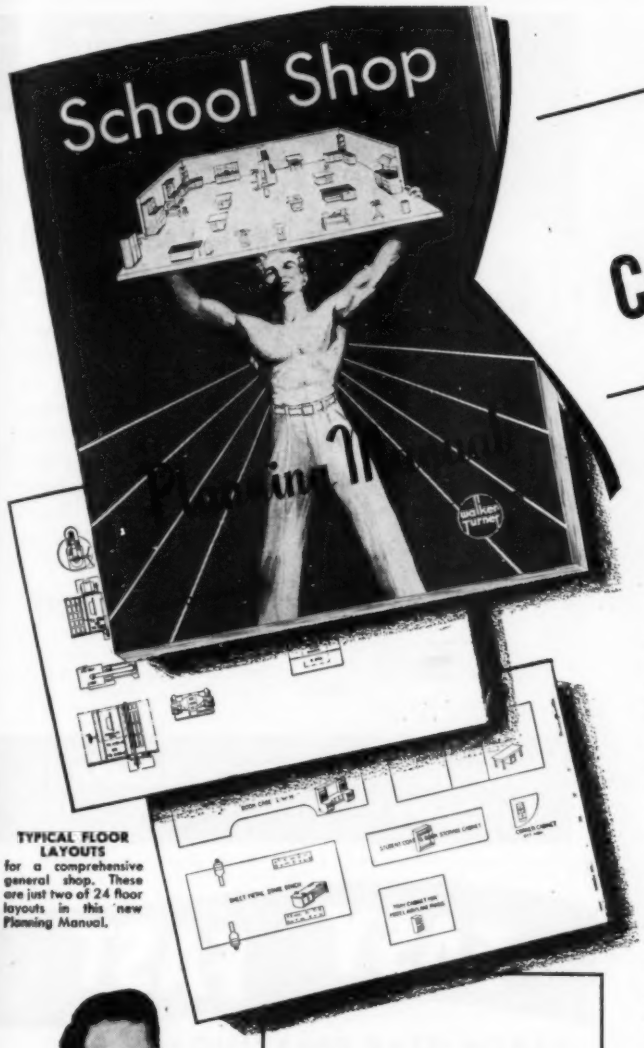
Manufacturers of Sheldon Precision Lathes • Milling Machines • Shapers
4244 N. KNOX AVENUE • CHICAGO 41, ILLINOIS, U. S. A.



TYPICAL FLOOR LAYOUTS for a comprehensive general shop. These are just two of 24 floor layouts in this new Planning Manual.

F. C. Finsterbach is eminently fitted to prepare a manual such as this on school shop planning. His experience includes: 25 years teaching at Cleveland, Ohio; Buffalo, N. Y.; Oswego State Teachers College; Oregon State College. B. S. from Buffalo State; M. S. at Wayne University; Doctoral studies at University of Buffalo. Contributor to A. V. A. Journal, Industrial Arts and Vocational Education, and School Shop Magazine. Former supervisor New York State Education Department and recently Assistant Professor of Industrial Arts. Now Director of Education, Walker-Turner Division, Kearney & Trecker Corporation. Member Epsilon Pi Tau and Phi Delta Kappa.

New Comprehensive MANUAL

for successfully planning your school shop

48 pages (8½″ x 11″) Over 750 silhouettes of shop equipment

Here, for the first time, is a manual which deals with the problem of school shop *planning*—deals with it practically and authoritatively. In point of view, as well as content, it marks a radical departure from other manuals in the fields of Industrial Arts and Vocational Education.

The author of "School Shop Planning" recognizes that there are essential differences stemming from the aims or purposes of each branch of industrial education, and that "the planning of the shop (should) reflect these differences, not so much in arrangement but in multiplicity of equipment, and in emphasis of instruction".

You will find, in this 48-page Manual published by the Walker-Turner Division of Kearney & Trecker Corp., not only floor layouts and silhouettes of the proved Walker-Turner power tools, but those of other equipment. In addition, certain of the commonly accepted practices have been included as "standards", together with equipment lists of a basic nature.

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- ★ Illustration of Planning Principles
- ★ Architectural Details
- ★ The Planning Center in a School Shop
- ★ Suggested Equipment for a Comprehensive General Shop

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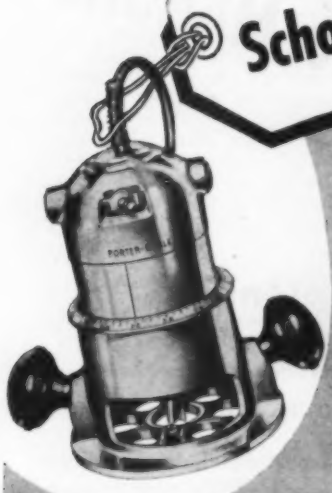

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Only $49.50

Enables students to make the intricate cuts required in professional furniture and cabinet making. Dadoes, rabbets, dovetails—does veining, fluting, beading—makes cut-outs and raised decorations. Wide variety of bits and cutters available. Portable. Easy to teach—easy to use—on the same job trained operators do in industry.

MORE FOR THE MONEY

Guild Router's low cost makes it a "buy" for tight school budgets. Another big advantage: Once you own a Guild Router you can more easily obtain *two more power tools* used extensively in the woodworking and construction trades! Here's why . . .

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Please send full information on ( ) Guild Router; ( ) Guild Router-Plane-Shaper Combination, and name of nearest dealer.

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Individually Power-Tested For Better Performance

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Openings 3/4-in. to 18-in.

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Openings 1 ft. to 12 ft.

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No. 101 Bench Furnace

Delivers up to 1800° F. without a blower. Powerful, efficient and economical. For heating soldering coppers up to 12 lbs. per pair. Ideal for heat treating, case hardening, and annealing carbon steels. Two burners. Firebox 3¾x4½x5½. Complete with work rest block and baffle plate.

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Use this furnace for heat treating carbon steels and for melting soft metals such as lead, tin, zinc, babbitt, etc. Lid on hood may be removed and 22 lb. melting pot inserted. Firebox 6¼x5x6½. Complete with pot as illustrated.

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The 955 equips the metal working teacher to train the student in every type of lathe operation. With 1″ collet capacity, 1⅜″ spindle hole, 11″ swing and center distances of 24″ or 36″, this lathe handles sizeable work *accurately*. Less than .0005″ spindle runout 12″ from the bearing; and a two-V-way, two-flat-way bed precision ground to within .0005″ maximum variation are typical of the tolerances to which it is built. The 45 to 1500 rpm speed range of the ball bearing mounted spindle permits all operations from roughing to high speed carbide tool cutting. Completely enclosed headstock, countershaft and motor means maximum safety for the student. The 955 is ruggedly built for hard school shop use. Its trim, compact steel cabinet is ideal for multiple installations. No other lathe of comparable specifications is comparable in low initial cost. Write now for full information.

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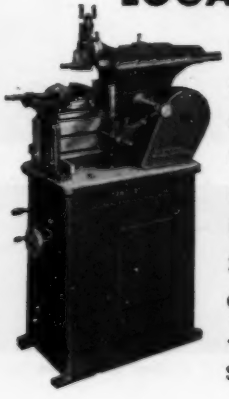

brings to the school shop the capacity, precision and versatility that make it a widely used industrial tool. Powerful 8½″ stroke. Six automatic feeds in either direction, from .002″ to .012″. Designed for safety.

Ideal for Classroom Instruction

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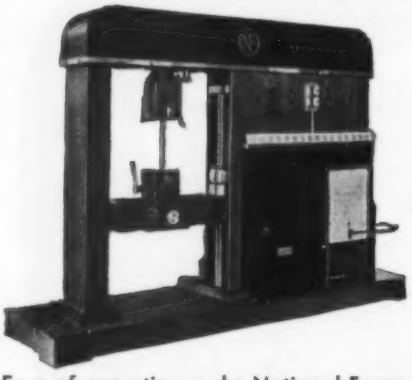

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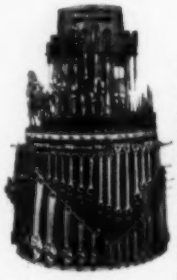

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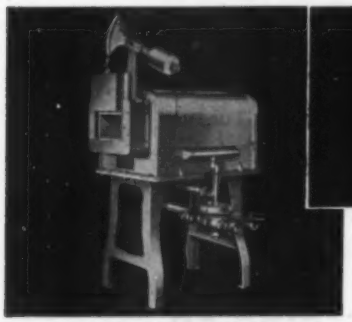

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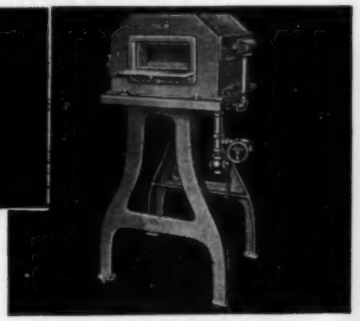
THE BEST INDUSTRIAL FURNACES MADE



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HUNDREDS OF THESE SUNBEAM STEWART FURNACES ARE IN THE VOCATIONAL DEPARTMENTS OF TECHNICAL SCHOOLS

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Because Sunbeam Stewart units have been designed for efficient production heat treating in small shops and tool rooms, they are widely recognized as standard equipment for all types of industrial heat treating and vocational training work. For student instruction and reference, write for our free "Guide to Furnace Selection." Aids in determining the type of furnace best suited for any work. Also ask for the new Data File on school units.

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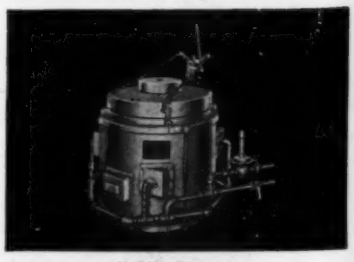
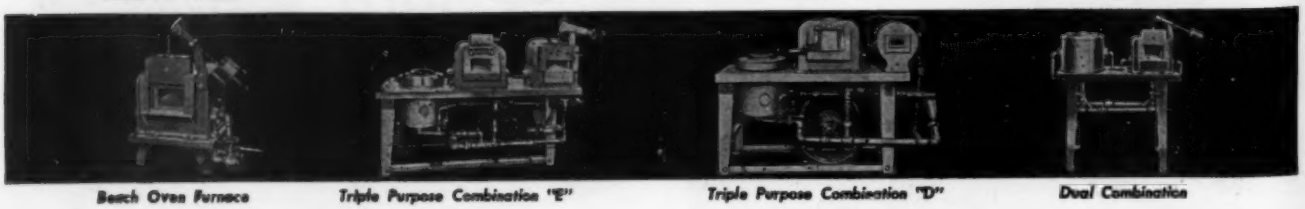


Melting Furnace



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how many advantages can you spot?

A quick look at these Cincinnati Tray-Tops should reveal up to ten important features you don't normally expect in an economy-priced lathe. And they're all worth considering on your next lathe purchase. You'll serve your students well by provinding instruction on Tray-Tops . . . the prices are lower than you may imagine. Swing sizes: 10″, 12½″, 15″ and 18″. Write for new catalog and name your dealer.

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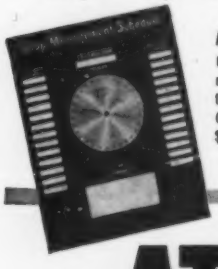

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Use this workmanlike shop management schedule to rotate the work, to see that each student gets in on all the principal shop activities. Order one for every class—only $2.50 each.

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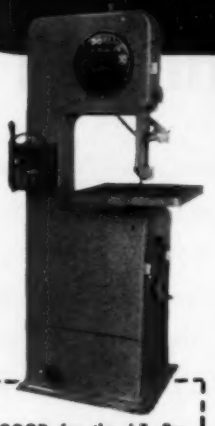
PRICED AND DESIGNED WITH THE SCHOOL SHOP IN MIND



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DOUBLE RANGE • VARIABLE SPEED
16" COMBINATION WITH WELDER
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STUDENTS quickly acquire skill, develop pride of accomplishment and enjoy learning to machine a great variety of materials with professional ability on this safe, easy to operate contour sawing, filing, polishing machine.

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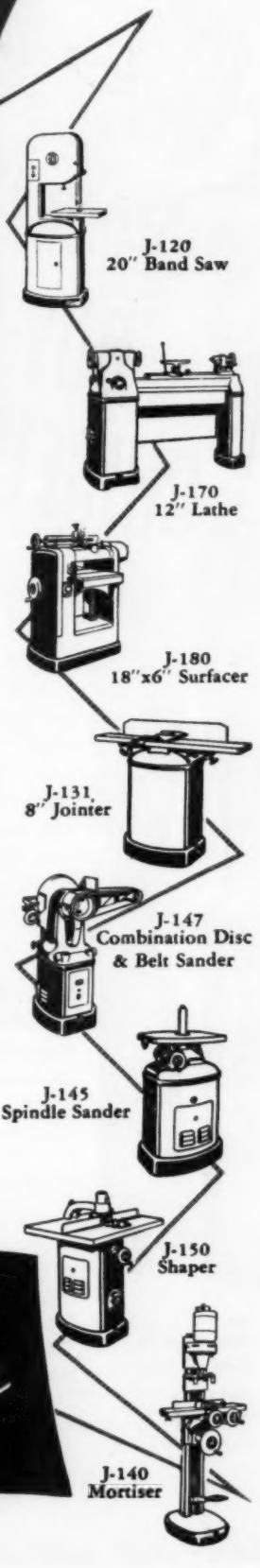

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Sizes: ¼" to 2"

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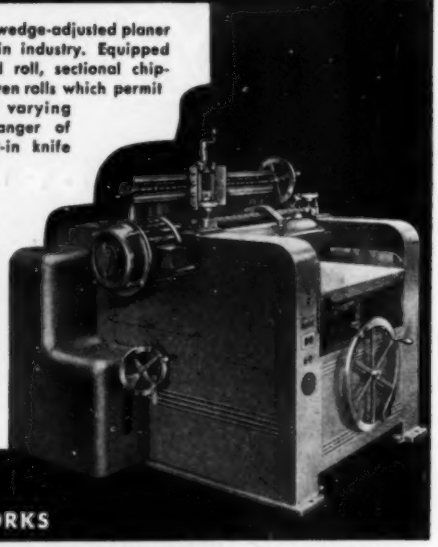

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So—specify Columbian and train your students on the same vises they will use in industry.

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Vocational educators, concerned with qualifying students to step into industry as adequately trained apprentices, will find the new Clausing tools ideal. They have the precision, capacity, and features required for sound and thorough instruction in the full range of modern lathe and drill press operation. They are big, heavy, rugged tools — designed to serve you dependably for years — yet moderately priced.

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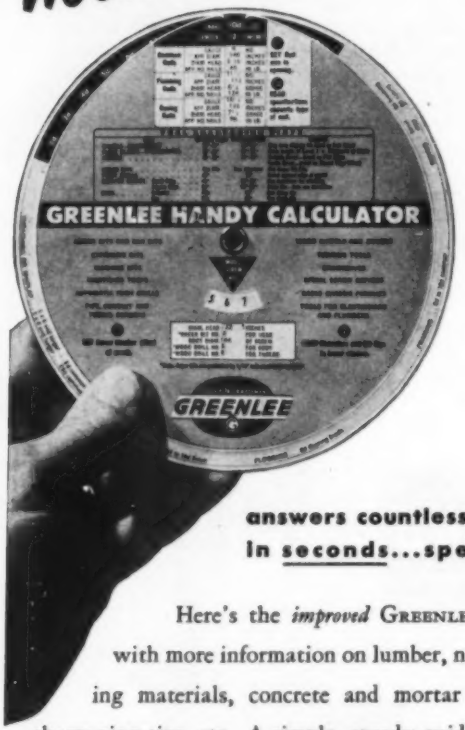

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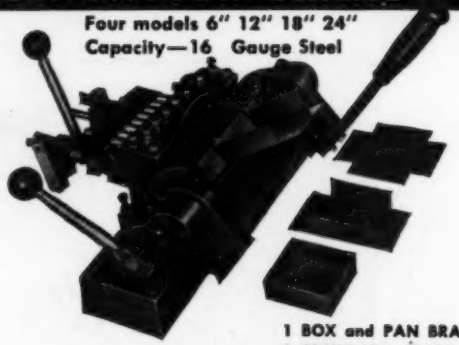

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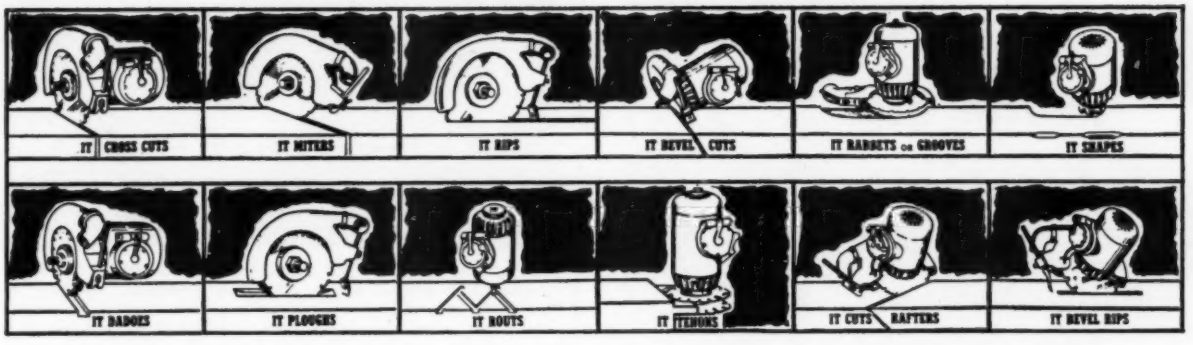

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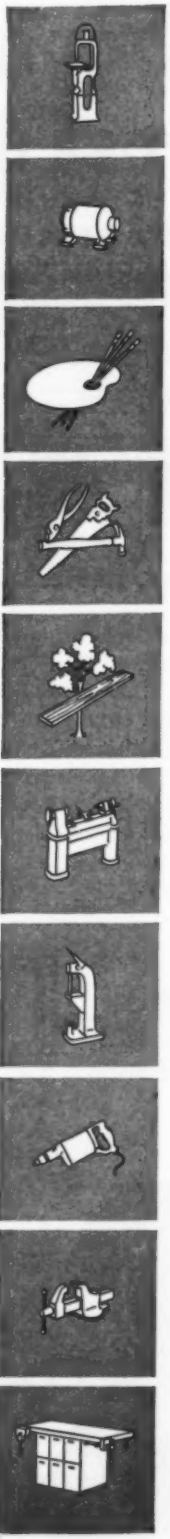

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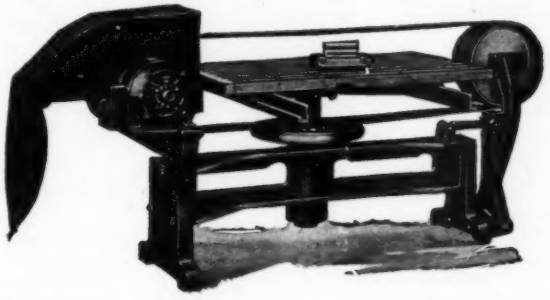
"OLIVER" No. 298 BELT SANDER



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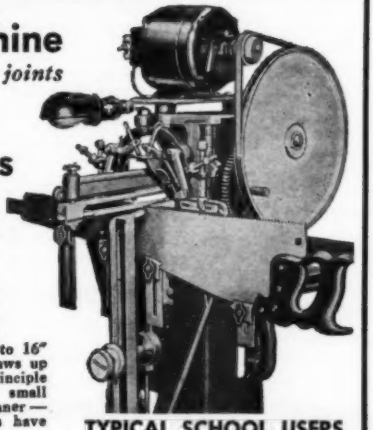
OLIVER MACHINERY COMPANY
Established 1890 GRAND RAPIDS 2, MICHIGAN

SAW FILING

This ONE Machine
automatically files and joints
HAND, BAND, CIRCULAR Saws



The Foley Saw Filer is ideal for sharpening saws used by students in school shops. It keeps them in tip-top shape, faster and better than by hand filing. Used by Army, Navy, hundreds of manual training departments and industrial plants. The Foley is the only machine that files and joints all hand, back and mitre box saws from 3 to 16 points per inch, crosscut circular saws up to 16" diameter (24" optional), and band saws up to 24' long. Patented jointing principle automatically evens up large and small teeth, so saws cut faster, truer, cleaner — stay sharp longer. Foley filed saws have less breakage and last longer.

30-DAY TRIAL OFFER

You may have the privilege of using the Foley Saw Filer in your own shop for 30 days. Write or send coupon for details and list of school users.

TYPICAL SCHOOL USERS

Berea College, Berea, Ky.; Board of Education, Cleveland, Ohio; Boys Technical H. S., Milwaukee, Wis.; Charleroi School District, Charleroi, Pa.; Redlands Public Schools, Redlands, Calif.; Stout Institute, Menomonie, Wis.

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Please send full information on 30-Day Trial Offer and list of school users of Foley Saw Filers.

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Instructional Materials Center at the Colorado State College of Education used an R8A Router and #61 Dovetail Attachment to dovetail 178 drawers for this drafting classroom. The new drawers improve both the appearance and utility of the room . . . will withstand years of rough classroom use.

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HOW LONG SHOULD JOINTER TABLES and FENCES BE?

In jointer design there is a definite relationship between fence length and table length. It is generally conceded that a jointer is as good as it is long. Lengthening of a table alone is not sufficient to increase the scope of use of a jointer. The fence, likewise, must be extended and should always be as long as the infeed table plus 60% of the length of the outfeed table and ABSOLUTELY RIGID ALONG ITS ENTIRE LENGTH. To assure accuracy and avoid work spoilage, tables and fences furthermore must be absolutely flat and straight. AND STAY THAT WAY regardless of abnormal operating conditions.

BOICE-CRANE JOINTERS

have the longest fences of any 6" or 8" jointers, the longest tables of any 8" jointers, and afford the biggest values in any 6" and 8" jointers. They are rugged and accurate.

All Boice-Crane jointer head bearings stand speeds up to 5500 r.p.m. Tables are simultaneously ground flat and parallel to closest limits — stay flat. Boice-Crane offers the only long-table jointers with full-length, front-adjusting, double-locked fences. When rabbeting, the exclusive guard on all Boice-Crane jointers stays on the machine — simply turn and swing out of the way.

NEW, WELDED, ALL-STEEL LONG-TABLE MODELS

Permit strength, permanent accuracy and alignment impossible with bolted-up cast iron construction. Using steel (3 times stronger than cast iron of same thickness), tables are extended without increasing width, thickness, weight or floor space. A comparable cast iron jointer would weigh more than twice as much. Tables undergirded full length. There are no springy overhanging tables to spoil heavy work. Steel is actually 2 to 3 times stiffer than iron. The entire infeed table is a rabbet arm. These are the first jointers with adequate support for narrow rabbeting on wide stock. Quick, positive, micrometer-accurate knife setting. All knives cut the exact same depth within .002" to .003" — setting a new standard for perfect work without chatter marks . . . better finish . . . smoother operation. 3¼-inch diameter head (3⅛-inch cutting circle), 20% larger than conventional 6-inch jointers. Improved cutting angle. Depth of cut control, table locks, direct reading depth scale and switch easily used in a comfortable, normal operating position. New rotor-on-cutterhead or V-belt drive is optional.

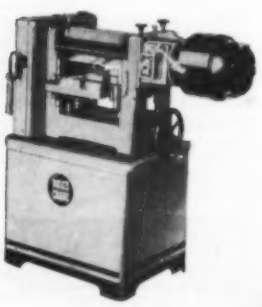
THE BOICE-CRANE NO. 1400 LOW-PRICED 6" JOINTER

Has cast iron table and base. Loaded with features not found on others in its price range. Its 36" tables are up to 6" longer than others; the fence extends practically full-length of the tables (35" long) and has exclusive front and rear lock rigidity. The larger 2¾" diameter cutterhead affords a freer cutting "rake-angle" to knives, for a chatterless and much smoother shearing cut rather than the chipping and chattering cut common to smaller diameter cutterheads.

Boice-Crane offers a complete line of job-rated jointers —

Model No.	*Size*	*Without auxiliary feeding aids, recommended for stock lengths to*	*Length being a factor, recommended for stock sizes to*	*Planes boards and panels to*	*Fence*	*Depth of cut*	*Cutterhead diameter*	*Cutting arc diameter*
3400	8" x 84"	8 ft.	8" x 8"	16" wide	66" x 4"	⅝"	3¼"	3⅜"
2400	6" x 60"	6 ft.	6" x 6"	12" wide	48" x 4"	⅝"	3¼"	3⅜"
1400	6" x 36"	4 ft.	4" x 6"	12" wide	33" x 3⅜"	⅝"	2¾"	3"

A HEAVY-DUTY PLANER OF PRACTICAL CAPACITY AT A SENSIBLE PRICE!



THE BOICE-CRANE 12" x 4" THICKNESS PLANER

Includes every feature, but costs a hundred dollars less than planers only slightly wider. All the capacity average shops use, at a saving of 30% under the next larger size. Handles jobs impossible with larger outsize planers. Without butt-feeding, it planes pieces down to 6½" long and hard wood down to as thin as 1/16", smooth as silk and to a thousandth of an inch precision, without tearing. Saves big money by salvaging short and thin scrap.

OVER 50% FASTER THAN SIMILAR UNITS

Powered for output of 14 feet per minute. Has a massive, one-piece main frame and the extra weight bolted-up frames lack for long, accurate service. Thousands of installations date back 15 or more years. Machine Serial No. 1 still operates daily, having planed millions of feet of hard wood.

STEADY, POWERFUL, GROOVED STEEL INFEED ROLL! FINER FEED MECHANISM ELIMINATES COSTLY MAINTENANCE!

No troublesome clutches or double-worm reduction gear overly vulnerable to intermittent strains and shocks in feeding stock. Simplified, quieter feed gear fully cushioned against jamb-ups in feeding that cause others to fail. Instant feed control without stopping motor. Power driven rolls in bronze-bushed self-aligning journals automatically adjust when work thickness varies — an exclusive feature.

SIMPLE, EASY BLADE SETTING

12¼" x 20" table. Thick walls and exceptionally well ribbed table casting stays flat and true. Two table idler rolls — often omitted in inferior machines.

SAFER, SMOOTHER OPERATION

Less power required. Choice of 1½ and 2 h.p. direct to cutterhead or V-belt motor, engine or lineshaft drive. Bench or complete floor type units.

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INDUSTRIAL ARTS *and* VOCATIONAL EDUCATION

MAY 1952

It's Requisition Time

DENVER SAMS
WILLIAM H. MASON
Instructors
Manufacturing Processes
Department of General Engineering
Purdue University
Lafayette, Ind.

Every shop teacher is required to perform certain nonteaching tasks which reduce the amount of time available for the improvement of actual teaching methods and conditions. It is probable that some form of student organization has improved conditions in almost every shop, but it is not enough to organize only the activities within the actual shop class. Those things which the teacher must do after he has taught his classes can be much more pleasant if some organized procedure is followed.

How Do You Order Your Expendable Supplies?

During the normal school year, the classes of the average shop teacher will consume a wide assortment of expendable supplies. The quantities and varieties will naturally vary with the type of shop program being offered. If a school system is offering a general shop program, plus several unit courses, the number of individual expendable supply items might well number in the hundreds.

The complete process of getting orders for these supplies into the hands of the vendors involved can be a very laborious task. To assure himself of getting exactly what he wants, the teacher must write detailed specifications for each individual item. Typewriters and clerical help are not always available, which means the initial rough requisitions must be written up in longhand by the shop teacher.

Do You Have a Definite System?

The time necessary to write up the requisitions for a single year can easily amount to a whole week's work, or even more. The way to reduce this time to an absolute minimum is to systematize the procedure.

The authors have found by experience that ordering supplies from year to year can be one of the most time-consuming tasks required outside of actual teaching hours. As a result of this unpleasant expenditure of time, the organized procedure described below was developed.

The first step in developing this systematic procedure was the classication of all expendable supplies used. After a careful survey of supplies normally used in a shop program, it was found that practically all such supplies could be grouped under the following headings:

A — Abrasives
B — Ceramics Supplies
C — Electrical Supplies
D — Etching Supplies
E — Expendable Tools
F — Finishing Supplies
G — Graphic Arts Supplies
H — Hardware
I — Leather Supplies
J — Metals
K — Miscellaneous
L — Plastic Supplies
M — Soldering Supplies
N — Upholstering Supplies
O — Woods

These major headings were each assigned a classification letter, as shown to the left of each of the headings above. Each item under the major heading was further designated with the major heading classification letter plus a number. This classification can best be understood if a study of the following example is made.

One of the most common expendable materials used in any shop program is wood in various forms. This major heading for wood was previously assigned the letter *O*. The individual wood items would then be listed as follows:

O–1 Cherry, 1″
O–2 Cherry, 2″
O–3 Walnut Squares, 2 x 2 x 30″
O–4 Birch Dowel Rod, ½″
O–5 Fir Plywood, ¼″
O–6 Mahogany Veneer

After the various major headings were developed and listed in the manner shown, the next step in organizing a definite requisition procedure was the developing of a suitable form which included all the information necessary to order the various items. This form is shown in Figure 1. If such a form is to be a help rather than a burden, it must be complete and versatile. It must be usable for all expendable materials. It must also provide for the keeping of certain records which the shop teacher may need to refer to at times.

The form in Figure 1 has versatility. The teacher can use it to keep a strict record of his total money spent, should he be required to work within a definite budget. He may use it to advantage when charging students for materials used, since provision is made for showing the unit cost each year. The form also has provisions for showing the approximate consumption of any item for the previous year, thus serving as a guide for the quantity to order for the coming year. Several alternative

EXPENDABLE SUPPLIES

Name of Item CHERRY LUMBER, 1" Item No. 0-1

No. 1 Vendor SHEAFFER HARDWOOD LUMBER CO.

Address LOGANSPORT, INDIANA

No. 2 Vendor BROADHEAD-GARRETT CO.

Address CLEVELAND 5, OHIO

No. 3 Vendor FRANK PAXTON LUMBER CO.

Address 5701 WEST 66TH STREET, CHICAGO 38, ILLINOIS

Complete Specifications	Ordering Unit	Estimated Unit Cost
CHERRY LUMBER 1" THICK RANDOM WIDTHS AND LENGTHS FIRSTS AND SECONDS ROUGH KILN DRIED	BOARD FOOT	$0.47

Vendor No.	Date Ordered	Date Rec'd	Quantity On Hand	Quantity Needed	Actual Unit Cost	Estimated Total Cost	Actual Total Cost
1	6-1-50	8-13-50	300	500	$0.41	$235.00	$205.00
2	6-1-51	9-6-51	100	800	$0.44	$376.00	$352.00
3	6-1-52			600		$282.00	

Fig. 1. Requisition form

vendors may be listed so that orders may be submitted expediently to a second vendor, should the first vendor be unable to supply the item. The form has been designed to last for ten years, and it is very likely that some revisions will need to be made by that time.

Fifty Hours This Year, Two Hours Each Year Hereafter

The expendable supplies were listed and classified in an orderly manner, and the desired form was developed. The next step was the filling in of the forms. It is safe to say that it took more than fifty man hours to submit our requisitions by the system used before this one was developed. The time required to set up this system was no more than that required to requisition the supplies for a single year, and it is a pleasant fact that no more than two hours are now required to submit our yearly requisitions with this new system in use. Instead of writing the complete specifications for the various items each year, it is now necessary to write only the date, vendor number, quantity, and the estimated cost.

When filling out the forms, the specifications and vendors should be compiled and written in the most careful manner. The accuracy of these two groups of information is extremely important, for errors may result in needless waste of money, and may cause delay in obtaining supplies. The specifications should be complete and of such general nature that the various items can be ordered from any of several vendors which supply them. For example, the cherry lumber specified on the form in Figure 1 would be specified in the same manner, no matter what vendor might supply it. Catalog numbers and brand names should in most cases be omitted from the specifications. There will be exceptions to this when a specific product of a certain manufacturer is needed in order to satisfy some type of requirement. The best sources of accurate specifications are the catalogs or other descriptive literature from various vendors.

It is almost always desirable to estimate the cost of an item when it is requisitioned. This estimate serves as a budgetary guide when supplies for a year are ordered.

Every effort should be made to fill out a separate form for each individual item. For example, every grade of sandpaper used should be specified on a separate form, since it may not be desirable to order all grades every year. This will involve some repetition when setting up this system, but it will prevent other difficulties later.

When the forms were all filled out, they were grouped and arranged numerically within each major group. They were then placed in a looseleaf notebook behind index tabs labeled with their respective major headings. This notebook was arbitrarily called the *master notebook*. A master list of the major headings was placed in the front of the notebook, and behind the index tab for each major heading was placed a list of all the items in that group, listed in the numerical order in which they were previously arranged. This notebook serves as a convenient means of storing the individual forms in a manner conducive to the prompt location of the form for any item when it is needed for any purpose.

Your Requisition Worries Are Over

When it is time to submit the annual requisitions, only four items need be filled in on the form for each item being ordered. These are: vendor number, date, quantity needed, and estimated cost. After this information has been written on the sheet for those items being ordered, they are withdrawn from the master notebook and transferred to a *vendor's notebook*. This is done in order that the sheets may be grouped according to vendors, thus facilitating the procedure of typing the final orders which are sent to the vendor. For

example, if varnish, pumice stone, and animal glue are to be ordered from Brodhead-Garrett Company, the individual sheets for these items are placed into the vendors notebook under an index tab labeled Brodhead-Garrett Company. When the official orders are finally typed, these items can all be listed consecutively on an order going to that company. After these orders have all been released, the sheets are then distributed back into the master notebook to be used again the following year, and to check on the individual items as they are received.

Considerable detail has been used in describing this system, and it is therefore likely to seem a bit involved. However if the following steps are kept clearly in mind and followed carefully, much satisfaction will surely exist after you have developed a similar system to suit your own circumstances.

1. Classify all the expendable materials used.
2. Design a form to suit your own conditions.
3. Fill out the forms and arrange them behind appropriate index tabs in a master notebook.
4. Type up the official orders from a vendors notebook.
5. Distribute the forms back into the master notebook after the official orders have been typed and released.
6. Keep the cost and other information up to date as items are received.

Industrial-Arts Traditions

CLAUDE E. NIHART
Head Supervisor
Vocational and Practical Arts
Los Angeles City Schools
Los Angeles, Calif.

The difficulty of shaking off traditions is likely to be one of the topics for discussion at conventions and informal gatherings of industrial-arts educators. From some of these discussions one might get the impression that industrial arts is in a deplorable state and that our industrial-arts traditions are outmoded and should be discarded. On the contrary, there are those who say that this is not the case and that the fault lies in digressing too far from our basic traditions as well as not being alert to the newer developments in the field. Those who make sweeping criticisms generally cite examples of shop programs that are poorly organized, inadequately housed and equipped, and taught by ill-prepared teachers. These programs are labeled as traditional. Instead, they could just as well have cited broad enriched programs of industrial arts that may be found in almost any part of the nation.

On the subject of tradition it should be recognized that the point of view of the supervisor differs somewhat from that of the teacher-educator in that the supervisor has an opportunity to be in daily contact with public school teaching situations, where he tries out and evaluates both new and old ideas of all kinds, i.e., curricula, courses of instruction, teaching methods, shop plans, student personnel organizations, and audio-visual materials.

We shall begin with the premise that there are both good and bad traditions. In this discussion we shall accentuate the positive and speak only of the good. Now, let us explode a few of the erroneous conceptions that have grown up about our finest traditions.

Tradition No. 1 – Pupil Interest

If industrial-arts teachers were to discard this tradition of the manual-arts era, they might as well close up shop. At first, interest is generally centered about the project. It does not take long for the beginning teacher to discover that there is considerable difference of opinion concerning what he had planned to have the boys make and what they really want to make. If he is a wise teacher, the boys are allowed to win out and he quickly adjusts his sights to student-teacher planning of up-to-the-minute boy-initiated projects. Pupil interest is even more important today than it was fifty years ago. Then it was such a relief to get away from sitting still in the classroom that pupils were not so critical as to what was actually done in the shops as they are today.

Study and investigation of technological developments and other related topics usually grow out of an interest in the work under way in the shops. Pupil interest is one of the key industrial-arts traditions.

Tradition No. 2 – An Organized Course of Instruction

A well-defined course of instruction, outlined in logical sequence, was featured in both the Swedish sloyd and the Russian system of tool instruction. To be sure, the approach was much too formal for American schools, but the tradition still lives and is considered good.

Witness the industrial-arts committee at the recent AVA Convention working on revision of "The Standards of Attainment," now out of print. This booklet has proved to be the most popular of all AVA publications.

Present-day courses are not so rigid and formal as in the past. They are flexible and easily adapted to different teaching situations. An organized course of instruction encourages a program of directed rather than incidental learning. The tradition of an organized course of instruction is worthy of retention.

Tradition No. 3 – The Development of Manipulative Skill

This is one of our oldest traditions. In simple terms it means "anything worth doing is worth doing well."

When we speak of developing manipula-

tive skill we must think of it in relation to the child's mental and physical maturity which will vary in elementary and secondary schools. One of the strengths of industrial arts is that it provides for individual differences.

The development of skill in the use of tools gives a satisfaction and joy of accomplishment that cannot be adequately described. When a youth holds a sharp cutting tool in his hands and by practice is able to guide it to perform accurately the work in progress, he has acquired a useful skill that will give him a feeling of confidence in any job he undertakes. Manipulative skills are still in demand in industry, in leisure-time activities, and in the work of maintaining the home. No one decries the development of skill in the three R's. Why then should the development of a reasonable degree of skill in the use of tools and machines be questioned?

Some educators question the importance of skill in industrial-arts classes, but probably their chief objection is the overemphasis placed on its development in some shop situations. However, in visiting industrial-arts shops in different sections of the United States, very little evidence is seen of an overemphasis on skill. On the other hand, there is much evidence of the lack of emphasis. There are altogether too many school shops where students are permitted to produce poorly designed, constructed, and finished projects.

The development of manipulative skill is one of our old traditions that needs rejuvenating.

Tradition No. 4 — Industrial Arts — A Part of General Education

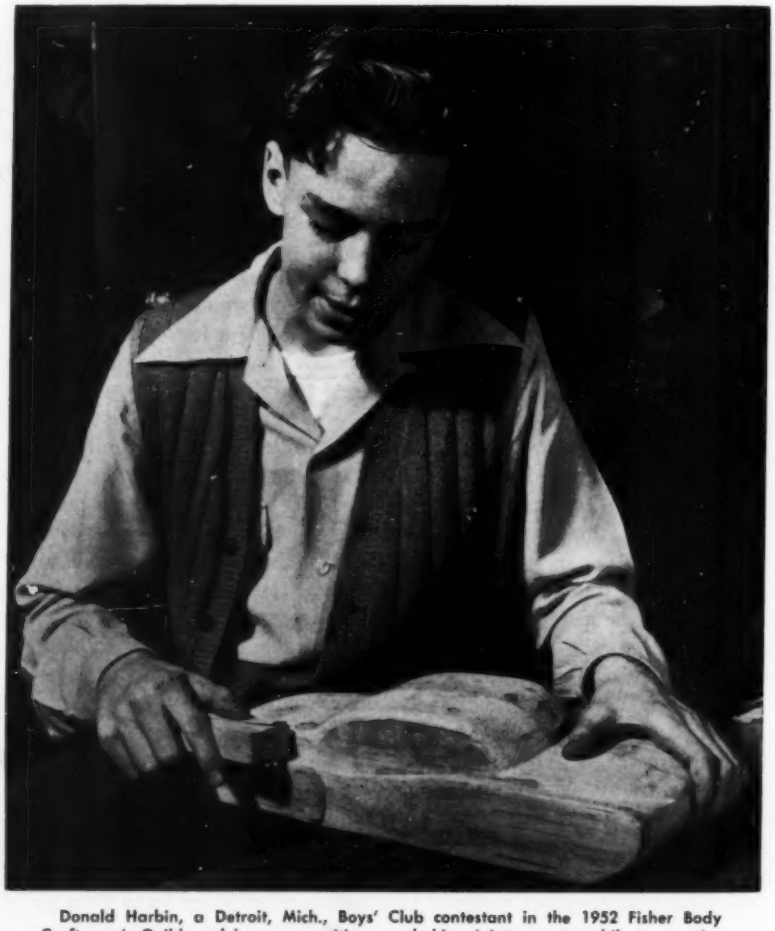
This sounds like modern educational philosophy, but in fact it is one of our earliest traditions. Otto Salomon, lecturing at the Seminarium for Teachers, Naas, Sweden, in the 1880's, made the following statement: "A *General* education is provided for by the elementary and secondary schools; while *Technical*, or *specialized*, education is furnished by the technical schools. Now, Sloyd is not a branch of technical education. It is not a training for certain trades or professions. It belongs purely to *general* education, and should find its place in the secondary and elementary schools of the land. It is equally good and useful for everybody."

Further evidence of this tradition may be found in an address given before the Social Science Association in Philadelphia in 1885 by Dr. Calvin M. Woodard, director of the St. Louis Manual Training School. The title of his address was "Manual Training, a Feature in General Education."

No educator could possibly want to shake off the tradition "industrial arts — a part of general education."

There are other worth-while industrial-arts traditions, but four examples are sufficient to prove the contention that many of our traditions are as educationally sound today as they were fifty years ago. In our anxiety for change we must not throw them away.

The Swedish sloyd, Russian system, manual training, and manual arts are the foundation stones upon which our modern industrial arts has been built. Those early programs of practical education were not failures, but from time to time they had to be modified to meet the needs of youth in a changing society. The industrial-arts program is also undergoing continuous change. An example of this change is a movement that has been under way for the past 25 years — that of broadening the base of the unit shop. This is in evidence in the junior high school program. The sheet-metal shop has been expanded by adding other related areas and renamed general metal. Printing has been broadened by including a number of special reproduction processes and is designated graphic arts. Handicraft offers experiences in many crafts. Electricity has passed through the bell-wiring stage and now includes motors, transformers, generators, telephone, telegraph, radio, and television activities. Still undergoing the broadening process are mechanical drawing and woodwork. The change of unit shops to limited general shops is a slow procedure, but it is making headway. A similar movement



Donald Harbin, a Detroit, Mich., Boys' Club contestant in the 1952 Fisher Body Craftsman's Guild model car competition, sands his miniature automobile to a satin-smooth finish. Donald, like thousands of other American boys, has his eye on one of the $65,000 worth of university scholarships and cash awards offered by the Guild for the best models

For further information about the contest, write to Fisher Body Craftsman's Guild, General Motors Bldg., Detroit 2, Mich.

has been going on for some time in small towns and rural areas where the unit shop is giving way to comprehensive general shop. Broadening the base of the unit shop is almost old enough to be considered a tradition.

Of course not all good things had their beginnings long ago. An old-timer sees many marked improvements, e.g.:

1. The environment in which learning takes place. The present-day conveniently arranged shops, well lighted and ventilated, with ceilings, walls, cabinets, and machines painted in industrially approved color combinations are certainly a big improvement over the old basement shops.

2. The use of instructional materials of all kinds. These include motion pictures, film strips, slides, charts, industrial exhibits, instruction sheets, reference books, cutaway models, and the like. Instructional materials have made teaching more interesting and effective.

3. Shop personnel organization. Pupils are given an opportunity to assume the responsibilities of citizenship in lifelike situations. In the shop, pupils put into practice what they have studied and discussed in social-science classes. A shop personnel organization is a living example of democracy in action.

4. Exploring the industrial arts. In junior high schools, pupils are routed through a series of experiences in several limited general shop activities. Usually, these include industrial drawing, handicraft, woodwork, general electricity, graphic arts, and general metal. A recent survey by the U. S. Office of Education shows that in California in excess of 80 per cent of the boys in junior high schools are enrolled in industrial-arts classes. Since 42 per cent of the male population in this state are engaged in trade and industrial occupations, the exploratory courses are a necessary feature of a functional guidance program. We do not want to see these and other improvements done away with.

Is a Complete Change Advisable?

The advocates of complete change would substitute for the present industrial-arts shop program a laboratory program, consisting of a combination of social studies, general science, and general shop courses. In cost it would be economical. Extensive equipment would be unnecessary since the development of skills would be de-emphasized. In this laboratory, invention and experimentation would be stressed, technology explored, and social and economic problems discussed. Undoubtedly, this would be a valuable program but could hardly take the place of modern industrial arts with its emphasis on exploration, problem solving, planning, pupil interest, hobbies, home maintenance, craftsmanship, consumer values, and citizenship. If the new laboratory program is sound, the quickest way for its advocates to prove its worth would be to set up a number of pilot programs located in urban and rural communities on "both sides of the tracks." A four- or five-year trial of these experimental programs, followed by an unbiased pupil-parent-educator appraisal, should tell the story.

On the other hand, the modern industrial-arts programs, as exemplified in thousands of schools and communities throughout the nation, have been time tested and found good. Schools in some other communities have not been so successful. These "down in the heel" outdated industrial-arts programs are easy targets for those who advocate a complete change. However, what appears to be failure in reality is only an unfinished task. It is the responsibility of loyal industrial-arts teachers, supervisors, and teacher-educators to finish the task of upgrading weak industrial-arts programs. Let's get past the speculative stage and go into action.

A Twofold Responsibility in Industrial-Arts Teacher Education

EMANUEL E. ERICSON
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Teacher education institutions have an important role in American life. In some ways the impact of their acceptance of that role is more far reaching than that of any other group of educational institutions. In general they are serious about the discharge of their responsibilities and have attempted to carry them out to the best interest of the ultimate consumer — the public schools of the nation. With the passing of time teacher-education programs have developed some fairly well-agreed-upon content for the so-called general education or liberal arts phases of their curricula; but less agreement exists regarding the many professional majors within the large number of specialized areas recognized as subject fields, particularly for secondary schools. Industrial arts, being one of the newer of these areas has been, for better or for worse, more varied in its departmental content, perhaps, than most of the other fields. It is with this subject area that this presentation is concerned.

Keeping industrial-arts teacher education in mind, then, the question might be asked: What is involved in discharging our responsibilities to the best interest of public education? In attempting to answer this question one might approach it with the thought that acceptance of this charge

leads to a twofold responsibility: (1) to select, prepare, and furnish teachers for industrial-arts programs as they now are, and, (2) to carry on a program of pioneering and leadership with a view of providing for industrial arts the expanded position and function which may be envisioned for it in the immediate and distant future. The first of these involves acceptance of the *status quo*, things as they are now; the second implies new concepts, reinterpretation of philosophy, change, reorganization.

Serving Schools as They Now Are

Obviously, the first essential for a teacher-education department is to serve the schools as they now are organized and operated. Without that qualification they can never hope to have a chance to bring about a situation which will give opportunities for change and improvement. Those who have placed industrial-arts teachers for any length of time over a wide geographical area will probably agree that the majority of calls are for teachers for established shops and not so often for men who will revolutionize the curriculum or the present program of the school. To be sure, young men are wanted who are expected to use effective teaching methods, "understanding adolescent youth," "take well with their students," etc., but they are not expected to tell the administration that the school program is antiquated and needs regeneration — not for the first semester or so anyway. To be able to fit into a present organization and go to work as a member of a team is probably the first prerequisite for success whether it be in school, or in industry, from which we proudly draw so many parallels for industrial arts.

Assuming that the foregoing conclusion is acceptable, what pertinent points present themselves for our teacher-education programs? Let us say that we personally and as a department have become convinced that industrial arts as taught in most schools in our service area is behind the time in philosophy and in practice. Unit shops are still used where they should not be, vocational education objectives and practices are not clearly segregated from industrial arts, and teachers do not have the vision of what industrial arts should contribute to the education of youth in our modern technological society. Would a logical reaction be to: (1) Set up our ideal school shop or laboratory within the college and solicit students (coming heavily from faculty homes) for it? (2) Have our prospective teachers do all their student teaching in this "laboratory" under the exclusive supervision of the department staff? (3) Probably even go so far as to arrange for our future graduates to obtain much of their craft skill and practice while observing, teaching, and doing "curriculum planning" in this shop?

Ideologically, such procedure might be employed. From a practical standpoint, however, would it not be professionally unfair to prospective graduates to let them feel that the cloistered existence which has been given them represents all that is respectable in industrial arts, and all else should be treated with scorn? And this would be emphasized when toward the end of the school year notices begin to appear on the bulletin board reading: "Woodwork teacher wanted for Westfield High School," "Printing position open at Willows (must be able to handle school paper)," "Electricity and radio job open at Greenville," and very few calls come along for the ideal setup which we have emphasized. The people who hire still write the ticket, and about the only way to get that first job outside of the phantom "pull" we hear about now and then, is to have at least a good semblance of the qualifications for the job.

It is hoped that the reader will understand that this is not a plea for the *status quo* in industrial arts. It is a plea for an appraisal of the fact that teacher education institutions, particularly those supported by public taxation, not only have the responsibility of serving the school systems as now conceived and operated, but, as a matter of fact, they might not be in business very long or very effectively unless they do so. This does not mean, however, that all is hopeless with reference to revision, reorganization, and even distinct departures as will be indicated later in this presentation.

Nor should it need to be assumed that any program of modern *unit* shops and limited general shops as now found in most systems is necessarily an impossible situation for realizing *enlightened* goals and objectives in industrial arts. Most of our definitions and goals for industrial arts, currently accepted either verbatim or in essence are at least 25 years old, and some of them were included by Solomon in his "Theory of Educational Sloyd," 60 or more years ago. While claims for attainment of all these on a large scale had better be modest, the failure, where it exists, probably lies to a greater extent with the teacher than with the subject or type of shop used. Be that as it may, the point here is that it will continue to be well to

Mr. Archie Bibbey, president of Industrial Arts Club, University of Minnesota, "throws" a pot in a live demonstration of ceramics at the AVA Convention
Photograph by Raymond J. Duffina and Robert C. Purcell
Submitted by William J. Micheels, professor of industrial education, University of Minnesota, Minneapolis, Minn.

let our teachers prepare first of all to interpret our philosophy and goals in the light of the type of organization which they will likely fall heir to when they get their first job; and that likelihood can be appraised to a considerable extent by surveys and close contact with prospective employers of our product.

Shaping the Future

As indicated previously the preparation of teachers for jobs as they now are is only one of the two main phases of responsibility under consideration. The other involves a frank and honest concern for the future, both immediate and remote, for better interpretation of the place and functions of industrial arts in education, for the expansion of programs to include all boys and girls, and for a more widespread action leading toward needed reorganization and provision of physical facilities that will make such programs and plans possible. How can this phase of our responsibilities be carried out? In the interest of brevity, the following items are listed with a minimum of discussion, since their very mention will itself probably suggest means for further implementation.

1. *Assume Leadership:* Teacher education departments and personnel must accept leadership responsibilities for interpreting the best in educational thought and procedure to schools and communities. This they can presumably do for some or all of the following reasons: (*a*) They are segregated from local tradition, personalities, and inhibitions. (*b*) They are in position to keep up with modern philosophy and practices in the field. (*c*) They presumably have (or should have) some time in their programs for field work, attending meetings, keeping up with literature. (*d*) Graduate research may often cover individual community needs. Field work should be an integral part of every department of teacher education. It may be formal and scheduled or casual and intermittent. If carried out in a spirit of humility and cooperation it will go far toward causing desirable progress in many schools and school systems.

2. *Keep in Touch With Graduates:* There may be just as much danger that the department program is lagging behind best practices in the field as that it is going too far ahead. Periodic responses from graduates by writing or in person will bring a fund of information valuable toward efficient operation of the teacher education program.

3. *Call Conferences of Administrators:* But when doing so it is most important that superintendents and general curriculum makers are in attendance as well as supervisors of industrial arts and departmental chairmen. Here is where the ground can be broken for the acceptance of teachers with modern ideas in industrial arts. And let us remember not to *tell them* but to let him *tell us*. In every such conference held at Santa Barbara over the years there have been enough administrators with a clear vision of the best values of industrial arts to elevate and enlarge the position of the subject field in the thinking of all the rest more effectively than could have been done by the departmental staff.

4. *Co-operate With the State Department of Education and Accept Its Guidance:* Such procedure will usually also lead to opportunities for contribution to the basic plans and patterns affecting industrial arts on a state-wide basis for all levels of schools, including certification standards. Without such co-operation a department in a tax-supported institution cannot hope to exert its maximum influence upon plans and practices in public education as a whole or in any specific phase of it.

5. *Carry on Experimentation and Research:* An earlier reference to a teaching laboratory within the institution was not meant to minimize the value of such a facility. In such a setting there is opportunity for work that cannot well be done in public schools. Here is where teachers in preparation, particularly those who show inclinations for it, can experiment under supervision, with newer ideas, class organization, and procedures. Our field has been brought up to its present state in a short time by men who were too busy to spend much time in evaluating and comparing results. Investigation and experimentation are needed and can be participated in on both undergraduate and graduate levels. Instead of sending our graduates out with the feeling that professional respectability demands a revolution in the shop assigned to them, often leading to chaos, let us give them a chance to temper enthusiasm with practical conditions before they go out. While the need for student teaching in typical school shops is appreciated, a teaching situation under full control of the department is invaluable in giving the teacher a chance to do some things which he can hope to develop *some day*.

The foregoing comments lead to the inevitable conclusion that a department of teacher education in industrial arts has an important and rather complicated role to play. It is affected by whims of those who employ its graduates, by limitations of facilities, both physical and staff; by the quality of its students, and by the desire to keep up with modern educational trends. If it ventures too far on uncharted seas it can easily overdo a seemingly good thing and promote a program that may lead to repudiation and retrogression of which the past is not without examples. On the other hand if the *status quo* is accepted and the vision is limited to filling jobs that now exist in the same manner that they are now handled, even if such jobs are in the majority, is there danger of commonplace routine performance, and stagnation? Or is it a question of one or the other of these two?

Surely our emerging teachers can be helped to develop an understanding of the functions of industrial arts in education to the point that all of their teaching will be permeated with a concern for the individual student and his adjustment as a present and future member in our complex technological society. This should be possible to a great degree regardless of the subject or type of shop in which he may teach. The same understanding should then stand him in good stead in finding opportunities to revise, reorganize, and refine physical facilities and curricula for suitable, progressive steps in the attainment of his ideal future goals.

Meanwhile his alma mater will continue with its twofold task in preparing teachers for the demands that exist; and then by tactful leadership assist them and the many schools and communities progressively to make industrial arts a truly integral part of general education.

STUDENTS FROM OTHER COUNTRIES

Ten nations were represented in a group of 14 vocational school administrators, supervisors, teacher trainers, and teachers who came from all parts of the globe and who were enrolled in the Department of Industrial Education at The Pennsylvania State College during the fall semester. Countries represented included Costa Rica, Finland, Germany, Haiti, India, Iran, Norway, Philippine Islands, Thailand, and Turkey. At the close of the fall semester members of the group visited schools in Pennsylvania and other states for a period of about four weeks before returning to their respective countries.

Photography as an Industrial-Arts Subject

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and
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Results of a National Survey of 76 Schools in Thirty States

What is the status of photography in our secondary schools? What are the present practices and trends in offering this activity? Are qualified teachers needed? How large do the classes run? What equipment and other facilities are available? What textbooks are being used? Are schools interested in teaching this activity?

In order to answer these questions, and others, one of the writers[1] of this article sent out ninety check lists to schools located in towns of from four to six thousand in population. Seventy-six questionnaires were returned from a geographical area of thirty states.

What Were the Results?

A review of the literature reveals that photography ranks second as a hobby indulged in by the people in the United States, according to a survey by the *Saturday Evening Post*.[2] There are about 6000 high school camera clubs in the country, most of which meet after school under the direction of a faculty adviser. Most of the pupils of high school age who are sufficiently interested in photography to elect it, have already done some picture taking and probably possess a camera of at least the box variety.

Forty-five per cent of those reporting indicated that they did not teach photography as either a club subject or as a course; however, almost 70 per cent of the schools surveyed signified that photography would fit into their curriculum as a course.

The range of members, both boys and girls, was from twelve to thirty students per class. The average size class of those responding was about twenty students. Groups most often met for 50 minute periods.

Most of the time photography has been conducted as a part of another course and is usually elective. Only 5 per cent of those responding indicated that photography was a separate course in the curriculum.

Only five of the respondents were conducting the photography activity in the industrial-arts department, as compared to fifteen who were conducting the instruction in the chemistry department. If the science courses are considered as a whole, it can be assumed that for all practical purposes, the science departments in our schools are taking the initiative in handling photography activities.

Over twenty per cent of the instructors surveyed are teaching portrait photography

More students were taking photography during the twelfth grade than during any of the other three grades surveyed.

Most teachers do not use a course outline, course of study, or syllabus while conducting photography activities. About one fourth of the respondents indicated that they used a course outline. About one eighth of those reporting indicated that they used a course of study or syllabus.

Textbooks were lacking in the photography classes. Only six of the respondents are using a textbook. Certain of the texts reported would seem to be too technical for the average high school student.

About one third of the schools reporting stated that the students were furnishing their own camera for the photography activity, as compared to about one fifth of the schools that furnish cameras either free of charge or on a rental basis.

The average school, according to this survey, has 1.5 contact printers and 1.9 enlargers. About one third of the schools reporting have equipment of both types.

A very small percentage of the total respondents indicated that they have a budget for the replacement of obsolete equipment, have a fiscal budget per student, or have a student expense allowance. There was a high percentage of schools which did not answer these questions.

Seventeen, or about 20 per cent, of the schools were letting the students use an unrestricted amount of materials in comparison to a very small percentage of respondents who do restrict the amount of materials given to the students.

Better than half of the respondents indicated that their students were taking pictures, developing film, making prints of negatives, and making enlargements in

[1]Binstock, Edwin J., "Photography in Secondary Schools," Unpublished master's thesis. The Stout Institute, Menomonie, Wis., 1951.

[2]Behrens, R. H., "Photography in the High School," INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, XXX (Mar., 1941), p. 117.

black and white. Better than one fifth of the instructors are teaching portrait photography and approximately 40 per cent reported that their students are doing production work for the school.

Most of the respondents have other courses to conduct. Three fourths of the respondents teach chemistry, physics, or general science.

Approximately 50 per cent of those reporting indicated a desire for additional training in photography. Over 40 per cent of the instructors have learned photography by individual study. One fifth of the respondents have had formal training in photography. Only a small percentage of the instructors reporting have had some trade experience in some phase of the photographic industry. About one fifth have had some college training in photography.

Conclusions

Photography is important on an avocational or general education basis and should be offered in the school, but has for the most part, not been given academic status. Since it is important to the school in a production way, some faculty person has generally been assigned to *struggle with it* either on a class or club basis or in some cases, merely as a production supervisor.

Most photography classes or clubs are being conducted by the physics and chemistry departments, inasmuch as a knowledge of both of these sciences, as they pertain to photography, is an essential aspect of such a course. It would seem, however, that the industrial-arts teacher could make a significant contribution by teaching photography on an activity basis, with students learning the craft as an industrial activity and not merely as a phase of science. Science teachers are prone to teach too much theory.[3]

Insufficient available space to house the photography laboratory hinders its inclusion in the high school curriculum.

The students should furnish their own camera while taking the photography course, inasmuch as all cameras have certain idiosyncrasies that must be overcome by the operator in order for him to take acceptable pictures. After the student has mastered the common box type camera, or any other inexpensive camera, the student may proceed to the more complicated cameras.

[3]Barnard, David P., "Photography Belongs to Industrial Arts," *School Shop*, X (Oct. 1950), p. 9.

Most of the schools surveyed do not have enough equipment to carry on a successful program in practical photography. It is evident that more equipment could probably be purchased if a plan were documented for inclusion in the school budget.

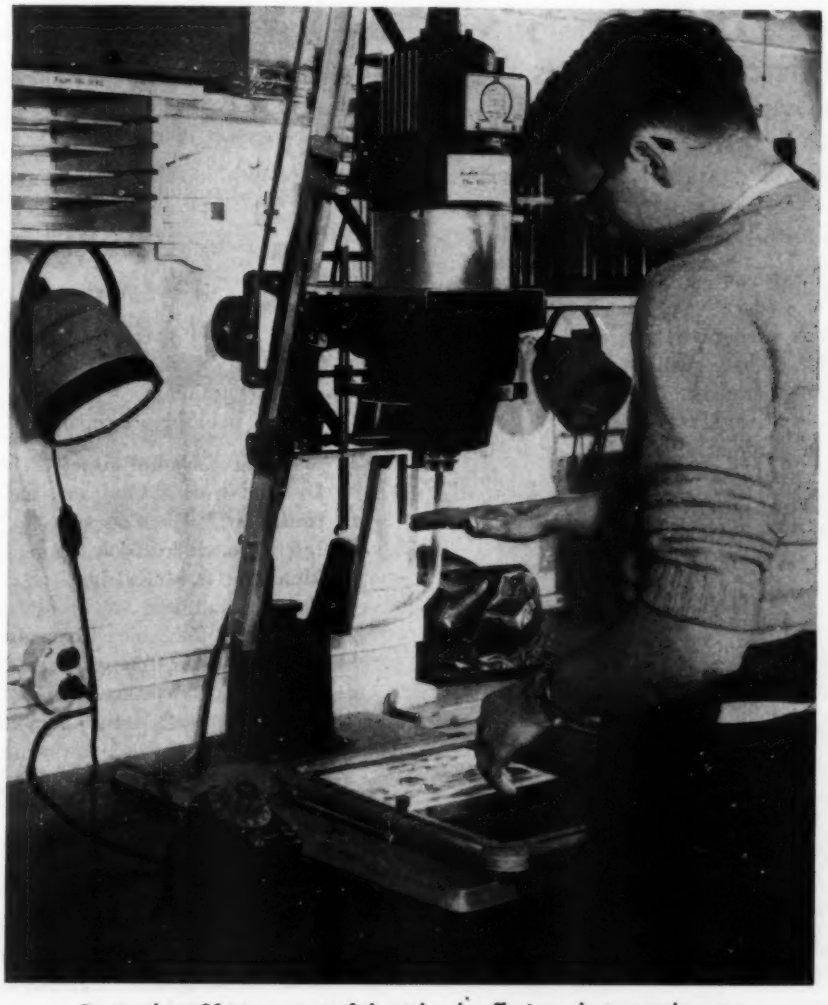
There is a need for photography teachers. A majority of the school administrators surveyed, indicated that they thought a course in photography would be desirable in the curriculum; the problem is to find a qualified instructor. Those persons interested in photography have not always had the opportunity to take a formal course in photography while in college. This may have some bearing on the apparent shortage of teachers in the photography field.

Recommendations

As a result of this study,[4] the writers recommend:

[4]Binstock, Edwin J., *op. cit.*

1. That photography should have academic status and become an integral part of the secondary school curriculum.
2. That the average class enrollment in photography be limited to twenty students per period and that the duration of the period be at least fifty minutes.
3. That photography continue to be offered on an elective basis.
4. That photography, if the specific circumstances permit, be conducted on the activity basis in the industrial-arts department.
5. That photography be offered in the ninth, tenth, eleventh, and twelfth grades.
6. That photography instructors use a course of study, syllabus, or course outline.
7. That more photography instructors use a textbook in conducting the photography class.
8. That students furnish their own



Better than fifty per cent of the schools offering photography are teaching it on the activity basis — "students learn by doing"

cameras in photography courses and clubs.

9. That schools teaching photography should have at least three contact printers and enlargers for every ten students.

10. That students receive their materials and supplies free of charge from the school.

11. That a budget be established for the replacement of obsolete equipment.

12. That teacher training colleges offer training in photography.

Leadership in Industrial-Arts Education

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Formerly Associate Professor of Education
The Stout Institute
Menomonie, Wis.
and
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Industrial-Arts Instructor
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What makes a man a leader in industrial-arts education? What are the elements which predispose toward success in this field? What qualities or characteristics identify leadership in this group of professional workers?

In a recent study of living leaders in industrial-arts education the following objective criteria in the selection of candidates were used:[1]

1. Writers of articles in the field of industrial-arts education.

2. Authors, coauthors, editors of publications in this field.

3. Heads of industrial-arts departments in teacher training institutions, or equivalent.

4. State supervisors of industrial arts or equivalent.

5. City supervisors of industrial arts or equivalent.

6. Inclusion in a previous study of this type.

7. Candidates (individuals meeting one or more of the first six criteria who were listed in *Who's Who in American Education* and/or *Leaders in Education*, and are mentioned as having been associated with industrial arts in one or both of these publications were designated as leaders in industrial arts education). Individuals who did not meet any one of the first six criteria listed above were not considered.

Sources of Information

Information for this study of leadership was obtained from the following sources:

1. The Education Index 1938–49
2. School Shop 1941–49
3. Industrial Arts and Vocational Education 1939–49
4. Mississippi Valley Industrial Arts Conference Membership 1947
5. Card Catalog
6. College and University Catalogs, limited to institution which offered industrial arts teacher training
7. Ten book publishing companies
   - *a*) American Technical Society
   - *b*) D. Van Nostrand Company, Inc.
   - *c*) Houghton Mifflin Company
   - *d*) International Textbook Company
   - *e*) McKnight & McKnight
   - *f*) Prentice-Hall, Inc.
   - *g*) The Bruce Publishing Company
   - *h*) The Macmillan Company
   - *i*) The Manual Arts Press
   - *j*) The McCormick-Mathers Publishing Company
8. Who's Who in American Education 1948
9. Leaders in Education 1948

Analysis of Leaders

An analysis of the 138 selected leaders in industrial-arts education reveals considerable variety in background, training, age, tenure, and position held.

Earned Degrees: The highest earned degree held by the leaders include 37 per cent with a doctor's degree, 56 per cent with a master's degree, and 7 per cent with a bachelor's degree.

Age Degree Received: More than half received the bachelor's degree while in their 20's although 42 were in their 30's. The master's degree was earned by a majority of these men when they were in their 30's, however thirty were between forty and fifty years and thirty-two were between twenty and thirty. Nearly half of the doctorates were earned while these leaders were in their 30's. Seventeen were between 40 and 50, while seven were fifty or over. Only three received this degree before they were thirty.

Age Distribution: Thirty-six per cent of the leaders were in the 50 to 59 age group, while 26 per cent were in the 40 to 49 group, and 24 per cent were in the 60 to 69 age bracket. Nine per cent of the leaders were over 70, while 6 per cent were between 30 and 40. None was younger than thirty while nearly 70 per cent of the leaders were over fifty years of age.

Tenure: Nearly 60 per cent of the men had been in their present position less than ten years: approximately 37 per cent had been there four years or less; while about 22 per cent had spent from five to ten years in that position. Slightly more than one fifth had been employed in the same position for twenty years or longer.

Type of Position: Type of position held was used as a selective criteria in this study. University staff members, representing 30 per cent of the total, were the most frequently mentioned leaders; although college and institute members accounted for 29 per cent of the group. Approximately one fourth were members of state department staffs, 15 per cent were city supervisors of industrial arts, and 2 per cent were with the United States Office of Education.

Geographical Distribution: All but 13 states were represented in the list of 138 leaders. The ten high states are as follows: 18, New York; 11, Ohio, Pennsylvania; 9, Wisconsin; 8, Michigan, Indiana; 7, California; 6, Texas, Illinois, Oklahoma.

Conclusion

A synthesis of leaders in industrial-arts education would reveal a Midwestern college or university faculty member in his fifties, the holder of the master's degree, and one who had been in his present position for about six years.

[1]Stanton L. Williams, "Living Leaders in Industrial Arts Education," Unpublished Plan "B" Paper, The Stout Institute, Menomonie, Wis., 1949, 85 pp.

Industrial Arts and Vocational Education
John J. Metz, *Editor*

SUMMER SCHOOL ATTENDANCE

Teachers of shop subjects should bear in mind that most educational agencies are slowly but steadily raising the educational requirements demanded of teachers. There was a time when the bachelor's degree was a desirable but not absolutely necessary requirement for getting a job as shop teacher. That day is over, however, and the younger men who are now entering the fields of industrial arts and vocational education should not be satisfied with the bachelor's degree which they received after four years of work at a teachers-education institution.

More and more shop teachers enroll for graduate work. It reflects in their classroom efficiency, their chances of success, and in the amount of their annual income.

New teachers should bear this in mind and lay plans for continuing their education as soon as they have received their bachelor's degree. Summer school attendance is an excellent way in which to earn additional credits toward an advance degree because it permits one to acquire money and teaching experience during the school year.

As usual, INDUSTRIAL ARTS AND VOCATIONAL EDUCATION carries a number of summer school advertisements and these are listed here for ready reference so that those interested in a certain institution may write for a bulletin.

Bradley University, Peoria 5, Ill. June 11 to July 17, and July 17 to August 21.

Colorado A. & M. College, Fort Collins, Colo. June 23 to July 18, and July 21 to August 15.

New York University, Washington Square, New York 3, N. Y. Intersession, June 2 to June 27. Summer session, June 30 to August 8. Postsession, August 11 to September 5.

Oregon State College, Corvallis, Ore. June 23 to August 15.

Oswego State Teachers College, Oswego, N. Y. Summer session, June 30 to August 8. Two shop sessions, June 30 to July 25 and July 28 to August 22.

Pennsylvania State College, Room 102 Burrowes Bldg., State College, Pa. Intersession, June 10 to 27. Main session, June 30 to August 9. Postsession, August 11 to 29.

The Stout Institute, Menomonie, Wis. June 16 to July 25.

Texas A. & M. College, College Station, Texas. June 9 to July 19 and July 21 to August 29.

University of Minnesota, 757 Johnston Hall, Minneapolis 14, Minn. June 16 to July 26 and July 28 to August 30.

University of Southern California, Los Angeles 7, Calif. Six weeks' session, June 23 to August 1. Four weeks' session, August 4 to August 29.

Wayne University, Detroit 1, Mich. June 23 — six, eight, or ten weeks.

THIS IS THE REQUISITION SEASON

How many of us have cussed, silently, and sometimes not so silently, when we were confronted with the task of writing out our annual requisitions? How often have we vowed that we would develop a good method of keeping track of our inventories and thus make it easier when requisition time came around again.

Unfortunately, good resolutions are not only broken the week after celebrating new years. Very few of us ever made good at developing that helpful requisition system that we promised ourselves to work out.

Now, however, Messrs. Sams and Mason have favored us with a full description of a plan that they have worked out. Do not fail to read "It's Requisition Time" on page 143 of this issue.

Probably after you have read it, you may say, as undoubtedly many will: "I could develop a better system." If you feel that way about it, don't forget to make good your assertion; otherwise you will not be any farther along a year from now than you are at present.

Probably the best thing to do is to take what the authors have worked out and adapt it to your needs. Then as time shows you how to improve it, make necessary changes and try again.

And while you are writing out your requisitions do not forget that the advertisements in this and other issues of this magazine offer you much informative material that will give you assistance in the serious problem of *what* and *how much* to order for next year's classes.

THINGS TO REMEMBER FOR VACATION TIME

Annually these pages call attention to warnings that should be given the students before they are released for their summer vacation. Some of the older teachers who have read these admonitions again and again should not be judged too harshly if they complain about these repetitions. However, there is a real necessity to harp strongly on some of the items mentioned because there are many new teachers each year who need to be reminded of the points emphasized in these vacation warnings. Then too, if one remembers that the same types of accidents occur year after year, one cannot complacently decide that the subject has been mentioned too often.

Hoping then that the editor may be forgiven if he repeats statements that he has made before, he will again ask teachers, especially those for whom INDUSTRIAL ARTS AND VOCATIONAL EDUCATION is published, to remind their students that vacation time can be a happy time, when wisely spent, but that it also may be a time of suffering, sorrow, and pain for those who are careless and foolhardy.

Probably the first subject of discussion might be the matter of safety. This must of necessity cover a lot of ground. Things to be warned against, under this heading, are very numerous, and, of course, can be only partly enumerated. There are literally thousands of accidents to younger and older children every summer on the streets, on the highways, at the lakes and rivers, climbing telephone and electric light poles, climbing around on buildings that are under construction, climbing trees, swimming and diving in unfamiliar waters, and trying daredevil leaps.

Then there are numerous acts of vandalism chalked up against these same youngsters. Much of the wrong done starts out innocently and is performed thoughtlessly. Probably if called to the student's attention now, it may prevent them from getting themselves into trouble later on.

Then there is the matter of health, poisoning from carelessly touching plants, eating berries, drinking impure water, and the like. Call attention again to the cautions issued to all of the schools on polio.

Prepare your pupils to have an enjoyable vacation during the coming summer.

Early Conceptions of Industrial Arts

WILLIAM T. BAWDEN
Emeritus Professor
Kansas State Teachers College
Pittsburg, Kans.

The series of biographical sketches of Leaders in Industrial Education is interrupted this month by a study in the evolution of thought regarding the educational values of industrial arts. The article which follows is self-explanatory. It is commended especially to instructors concerned with the preparation of shop teachers, who may want to discuss with their students these contrasting statements dealing with the underlying philosophy of industrial arts. The series of biographical sketches will be resumed again when this article is ended.

The first manual training school in the United States, a private school, was opened at Washington University, St. Louis, Mo., on September 6, 1880. The first manual training high school to be supported as part of a public school system was opened March 3, 1884, in Baltimore, Md. The development that took place during the ensuing decades is summarized by Bennett:[1]

"In the ten years from 1883, when manual training first began to appear in the public schools, to 1893, manual training was introduced into public high schools in more than 50 cities in the United States. By 1900, this number had more than doubled."

For the sake of clarity it should be explained that the term, "manual training," is used in this discussion when dealing with the early period of development, when that was the commonly accepted designation for shopwork instruction with tools, materials, and construction in the public schools. Following the suggestion, originally made by Charles R. Richards in 1904,[2] changes in concepts, methods, materials, and content of courses of study generally led to the adoption of the term, "industrial arts."

By 1950, it was estimated that there were from 30,000 to 35,000 instructors and supervisors of industrial arts in the United States. Not only was the name gradually changed from "manual training" to "industrial arts," and the number of teachers and supervisors increased from a handful to well over 30,000 in less than seventy years, there was also a corresponding evolution in aims and purposes, and in the underlying philosophy of the movement.

Recently there came to my attention some original source material from which it is possible to sketch a graphic outline of the status of manual training in the minds of educational leaders at the turn of the century. This material was made available by Dr. H. A. Sotzin, director of the division of industrial education, San Jose State College, San Jose, Calif.[3] During his term of service at the University of Cincinnati, Dr. Sotzin became acquainted with the late Dr. Randall J. Condon, who served as superintendent of public schools in Cincinnati from 1913 to 1929.[4]

In 1904, while serving as secretary of the Montana State Teachers Association, Dr. Condon undertook a study of the values of manual training, the results of which he submitted in the form of a report to the Association. In the course of this study Dr. Condon addressed a letter to a number of prominent educational leaders, with request for assistance. The letter was dated October 31, 1904, and read as follows:

"I am attempting to answer for the Montana State Teachers Association the question, What is the value of manual training in the development of good character? I want to incorporate some firsthand, fresh testimony from witnesses who, from personal observation, are competent to testify. To this end I am asking a few of the leading educators to give me information based not on theory but upon observed results.

"My excuse for making this request is my desire to present the matter in a strong, fresh light to the teachers of this state, where, outside of Helena and one other city, manual training is not taught, and where I wish to begin a campaign that shall result in its general adoption as a part of the regular schoolwork.

"The testimony which I wish to receive might come in reply to these questions:

"What qualities of character are developed by a course in manual training?

"In what way does manual training produce these results?

"Or, how much better off (morally) is a boy or girl who has had a course in manual training than one who has not had such a course?

"In your judgment is there in our present scheme of education any other study from which we are likely to obtain these results?

"While realizing that the work is formation rather than reformation, I shall still be glad of a limited amount of testimony in regard to the following: Instances in which pronounced reformative effects have been produced in classes or in individual

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[1]Charles A. Bennett, *History of Manual and Industrial Education, 1870 to 1917*. Peoria, Ill., The Manual Arts Press (now Chas. A. Bennett Co., Inc.), 1937, p. 397.

[2]Bawden, *Leaders in Industrial Education* (Milwaukee, Wis.; The Bruce Publishing Company), p. 23.

[3]Heber Allen Sotzin is a native of Pennsylvania; a graduate of the Williamson Trade School, Williamson, Pa.; and a wood patternmaker by trade. He attended the University of Chicago, and is a graduate of George Washington University, Washington, D. C., degree A.B., 1923, and M.A., 1926. He completed his graduate work at the University of Cincinnati, Cincinnati, Ohio, where he received the Ph.D. degree in 1929. He taught woodwork and drafting in secondary schools in Indiana, Pennsylvania, and Washington, D. C. Since 1929 he has been head of the department of industrial education at San Jose State College, and since 1950 he has also been chairman of the division of applied arts.

[4]Randall Judson Condon was born at Friendship, Me., July 10, 1862; and died in Cincinnati, December 25, 1931. He was a graduate of Colby University, A.B., 1886; A.M., 1901; LL.D., 1913; also, University of Cincinnati, LL.D., 1925. He served as principal of the high school, Richmond, Me., 1886–89; member of the Maine House of Representatives, 1886–88; district superintendent of school, Templeton, Mass., 1889–91; superintendent of schools, Everett, Mass., 1901–02; same, Helena, Mont., 1902–10; secretary, Montana State Textbook Commission, 1906–10; superintendent of public schools, Providence, R. I., 1910–12; same, Cincinnati, Ohio, 1913–29. He was active in educational and professional organizations.

pupils, through the influence of the work in manual training.

"With great appreciation for the favor of a reply, and for permission to use your name in connection with the same, etc."

Historic Letters

Dr. Condon preserved the replies to this letter, which were received during the months of November and December, 1904, and gave Dr. Sotzin permission to make copies, which are now preserved in a bound volume in the library of the department at San Jose State College. The temporary loan of this volume enabled me to prepare the following excerpts from the 14 letters. As indicated, I do not attempt to quote the longer letters in full.

In some cases in which information was obtainable, I have appended brief biographical notes concerning the authors of the letters, to assist the reader in evaluating the significance of the sources.

ELISHA BENJAMIN ANDREWS

Chancellor, University of Nebraska, Lincoln

NOTE. Born at Hinsdale, N. H., January 10, 1844; died, October 30, 1917. He was a graduate of Brown University, A.B., 1870; A.M., 1873; and of Colby University, D.D., 1884; also the recipient of numerous honorary degrees. Principal, Connecticut Literary Institute, Suffield, 1870–72; Baptist clergyman, 1874–75; president, Denison University, Granville, Ohio, 1875–79; professor of homiletics, Newton Theological Institute, 1879–82; professor of history and political economy, Brown University, Providence, R. I., 1882–88; same, Cornell University, Ithaca, N. Y., 1888–89; president, Brown University, 1889–98; superintendent of schools, Chicago, Ill., 1898–1900; chancellor, University of Nebraska, Lincoln, 1900–08.

The immediate and most obvious results of manual training in physical arts and crafts are keen eyes and deft hands, boys and girls able to do a great many useful things.

The educator, however, cares comparatively little for this side, although he does not regard it as unimportant. The immaterial effects of the training impress him most — mental skill, quickness, alertness, intelligence — in a word, the *knowing* which issues from good manual training is vastly more significant than mere handicraft.

(With respect to) the elements of character, the moral results, developed by manual training, these are numerous and of the highest order. First is patience, for no pupil becomes at all adept in the use of the hand and eye without uncommon persistence, the quality which is so indispensible to a successful life. *Courage* goes along with this, because the pupil must rise up undaunted and proceed after very many failures.

General altruism is developed, for it has from the first been laid down in our courses of manual training that the things we are trained to make are *useful* things. The powers we are set to cultivate are *useful* powers.

Normally trained pupils, furthermore, are led by their work to sympathize with hand workers at large, educated and uneducated. There is thus set up an influence tending to make school pupils a bond between the industrial and the leisure classes, to establish that common sympathy between the various layers of society without which there can be no social body strictly speaking, and no really joint social action.

In every aspect of the case, therefore, manual training deserves to be fostered by school men and women, and by the public.

ANDREW SLOAN DRAPER

Commissioner of Education, State Department of Education, Albany, N. Y.

NOTE. Born at Westford, N. Y., June 21, 1848; died, April 17, 1913. He was a graduate of the Albany Law School, LL.B., 1871; Colgate University, LL.D., 1889; and was the recipient of numerous honorary degrees. He practiced law in Albany, 1871–85; served as state superintendent of public instruction, Albany, 1886–92, and returned as the first commissioner of education, with the reorganization of the department, 1904–13; superintendent of public schools, Cleveland, Ohio, 1892–94; president of the University of Illinois, 1894–1904.

Manual training develops the observing faculties of the child; it leads him to see things which he would not have otherwise seen. If he has any mechanical gift, it develops that. It enables him to do things, and gives him the pleasure which comes from accomplishment.

It makes for higher and better living to be able to *do* things, far more than it does simply to *know* things.

Moreover, manual training dignifies the hand industries, and adds to the productivity and therefore to the wealth and power of the country, as well as to those of the individual.

DAVID STARR JORDAN

President, Leland Stanford Junior University, Palo Alto, Calif.

NOTE. Born at Gainesville, N. Y., January 19, 1851; died, September 19, 1931. He was a graduate of Cornell University, M.S., 1872; Indiana Medical College, M.D., 1875; Butler University, Ph.D., 1878; also the recipient of numerous honorary degrees. He served as instructor of botany, Cornell University, 1871–72; professor of natural history, Lombard University, 1872–83; principal, Collegiate Institute, Appleton, Wis., 1873–74; instructor, high school, Indianapolis, Ind., 1874–75; professor of biology, Butler University, 1875–79; professor of zoology, Indiana State University, 1879–85; president, same, 1885–91; president, Stanford University, 1891–1913; chancellor, same, 1913–16. Active in scientific societies and author of important works.

Any boy or girl who has had manual training is, in my judgment, better off morally, for two reason: (1) he has learned to control his muscles through his mind, and thus has a wider range of strength than persons who have not acquired this power. Any and every acquisition of strength makes for morality. (2) The range of his interests is widened, and that again makes for good conduct.

Idleness of brain and muscle is among the main causes of the various lapses in immorality. Wickedness is mostly negative, and associated with laziness and leisure.

DAVID S. SNEDDEN

Assistant Professor of Education, Leland Stanford Junior University, Palo Alto, Calif.

NOTE. Born at Havilah, Calif., November 19, 1868; died at his home in Palo Alto, December 1, 1951. He was a graduate of St. Vincent's College, A.B., 1889; Stanford University, A.B., 1897; Teachers College, Columbia University, New York, A.M., 1901, and Ph.D., 1907. Principal of schools, 1892–95, Santa Paula, Calif.; superintendent of schools, Paso Robles, 1897–1901; assistant professor of education, Stanford University, 1901–05; adjunct professor of educational administration, Teachers College, Columbia University, 1905–09; commissioner of education, State Department of Education, Boston, Mass., 1909–16; professor of educational sociology and vocational education, Teachers College,

1916–35. Following his retirement he made his home in Palo Alto, Calif.

In the first place, permit me to say that there is much nonsense discussed under the head of "The value of manual training in producing good character." Some people who still rest under the influence of the dogma of formal discipline in education seem to think that special training of one kind produces results that affect all faculties. . . . Neither psychology nor experience, rightly interpreted, give us any justification for such wide generalizations.

In the minds of educators manual training has suffered at the hands of its friends of that class who see in it a panacea for all defects of character. So at the outset let us beware of a false psychology in this matter. I feel very keenly on this point. . . .

What elements of character are developed by a course in manual training? Character is a complex assemblage of habits, or characteristic feelings, of customary attitudes of mind, and the like. There are few simple elements in character, and these are the products mostly of heredity rather than training. Of these habits and attitudes manual training can produce some. The ability to make something with the hands and with tools gives a sense of power in this field which measurably reacts on one's appreciation of his ability to earn a living; it gives certain appreciations of the value of handwork; and it gives a certain enjoyment of the products of labor which one would not otherwise have.

These are all factors in character. Alone, they are not much; but in combination with somewhat similar factors derived from other kinds of work they make character. I cannot enumerate all the results of character that flow from manual training; but I think we had best not deceive ourselves by attributing to it some esoteric power, some "general influence" on character. Manual training, in giving a multitude of specific reactions, is of the greatest service, and it is needless for its votaries to attribute to it unprovable results. . . .

(Among the ways in which these desirable results are produced may be mentioned) the workmanship attitude of mind, which insists on completion, finish, durability. This is a moral quality, produced by sufficient insistence on these points in connection with work done. But let us not infer that the workmanship attitude of mind will necessarily reach over into that other moral field where punctuality in keeping engagements, or honorableness in paying debts are involved. These come from their own kind of training. . . .

Again, the boy who has had a good course (in manual training) may leave school with a certain determination or bent toward a vocation, and perhaps some capacity for taking it up, and this is better morally than to leave school all adrift as to vocation. In these and some other respects most pupils who have had manual training are better off morally.

As a rule, manual training may give certain elements or factors in moral training which cannot be provided elsewhere. It simply adds a bundle of habits and feelings which are valuable and helpful. But I think much depends on the method of teaching the subject. The man who assumes that when a boy has once learned how to saw a board exactly "square," he will thereafter be more "square" in conduct, assumes too much for his argument. . . .

Manual training is worth while, but its results are fairly specific, as are the results of most studies. We widen the results as we widen the fields of experience, and especially as we connect them with the vital aspects of current life. Manual training is today much weakened by the abstract system employed which tends to detach it from real life, from practical activities. . . .

Personally, I am a most emphatic believer in manual training, and want to see it become universally a part of the curriculum.

CHARLES WILLIAM ELIOT

President, Harvard University, Cambridge, Mass.

NOTE. Born in Boston, Mass., March 20, 1834; died, August 22, 1926. He was a graduate of Harvard University, A.B., 1853; A.M., 1856; LL.D., 1909; also the recipient of numerous honorary degrees. Tutor in mathematics, Harvard University, 1854–58; assistant professor of mathematics and chemistry, same, 1858–63; professor of analytical chemistry, Massachusetts Institute of Technology, 1865–69; president, Harvard University, 1869–1909. Active in scientific societies and author of important works. Recognized as the foremost educational leader of his generation.

A course in manual training seems to me not only to give boys a better use of their eyes and hands, but also to give them a better sense of what accurate and faithful work is. To that extent it supplies moral training.

The manual training which now makes part of many public school systems is, in general, an attempt to give city children some compensation for the loss of the training which boys used to get on the farm. It is very imperfect compensation, but it is much better than nothing.

JACOB AUGUST RIIS

Author and Publicist, New York City

NOTE. Born in Ribe, Denmark, May 3, 1844; died, May 26, 1914. Came to New York as a young man and secured employment as a police reporter on the old New York *Sun;* became active in the parks and playgrounds movement, and in tenement house and school reform. In 1897, he was appointed secretary of the New York Small Parks Commission; author of numerous works dealing with economic and social problems, including: *How the Other Half Lives, The Call of the Poor, The Making of an American, The Battle With the Slum.*

The case was put brightly once by an old schoolmaster who had seen manual training grow. He said, "It makes boys honest with themselves."

When every blow of a hammer, every stroke of a plane, leaves its *record,* not to be gotten over, the boy sees a light.

When I first saw the Viking ship dug out in Normandy after a thousand years, the thing that caught my eye was the record left on the oak timber of the bow of the ship, of a lazy carpenter's ax — every nick in it was there, plain to see. He had been too lazy to grind the ax, and a thousand years after the fact stood out plain.

This I know, that when you put into a boy's hands tools which he *wants,* at the time when he is like a steam boiler under full steam and *must be doing,* and see to it that the work he does comes out clear and square and true, something within him responds and is fashioned at the same time, coming out true and honest and square too.

That is the story of manual training so long as you don't make a fad of it. That spoils everything. Tell it to the world and fear not!

J. F. HILLSPAUGH

State Normal School, Los Angeles, Calif.

NOTE. The Normal School later became the Southern Branch of the University of California, and still later the institution was reorganized as the University of California at Los Angeles.

A well-administered course in manual training tends to develop sturdiness of character, resolution, honor, and kindred virtues. This it does by leading to the formation of habits of accuracy, truth acting, and by making constant demands upon the pupil for the exercise of self-control; also by dealing with materials and tools, which are tangible, and which offer little opportunity for reliance upon wit.

In this subject a boy learns that only what he does counts; that for all his carelessness, idleness, and inaccuracy there will be a reckoning, and he may pay the penalty.

He also learns that, whereas in other subjects smartness and bluffing sometimes serve to conceal ignorance and lack of preparation, they are of no avail here.

These results are not produced in like degree by any other subject. The function of manual training, however, is not in my judgment mainly to develop specific moral qualities, though doubtless it does so indirectly. It is rather to furnish pupils a stock of primary ideas and relations derived in such a way as to give them real meaning, and to render them practically useful for apperceptive purposes at a later time. Then, too, it gives something like a proper balance to the mind by developing its motor side.

G. F. HITCHCOCK

Director, High School Department, Pratt Institute, Brooklyn, N. Y.

Among the qualities of character developed by a course in manual training the chief ones are self-reliance and a habit of accuracy. There are other desirable qualities, but these are easily first.

In regard to the way in which manual training produces these results, I would say that manual training is a subject in which *results to be accepted must be absolutely right*. A joint is not accepted until it is *perfect*. A piece of machine work does not fulfill its purpose until it is *right*. Work may not be presented that is "good enough." . . .

If pupils are made to see this at the start, they soon fall into *the habit of getting things right*, and this habit does not stop outside the workshop.

Self-reliance is produced by the fact that the work has to be done entirely by the student himself. He must get the work done without help, and must get it done right without help. . . . If a boy or girl gets into the habit of doing work right, of absolute accuracy in his handwork, he or she does acquire the habit in other lines. . . .

In saying this I do not mean that manual training eradicates dishonesty from academic work; but I am sure that the standard is always at hand in a boy's mind, so that he can judge quickly as to the honesty of his work, if he attempts in academic work things that he could not do in manual training.

ROBERT M. SMITH

Supervisor of Manual Training and Domestic Science, Public Schools, Chicago, Ill.

It is impossible to enumerate a moral quality which is not inculcated by systematic manual training. Nothing demonstrates the difference between right and wrong so clearly as actual work, and the impression is more lasting if pupils detect their own errors than if they have to rely on having them pointed out. In manual exercises they need not wait for a teacher to tell them when they make a mistake. . . . The highest moral considerations indicate manual training as the best means of developing upright character. . . .

The way in which manual training produces these results may be observed in the development of self-reliance — not the kind of self-reliance based on an individual's exalted opinion of his own powers, but that which has for its basis a true knowledge of its possessor's ability, combined with a general readiness to make use of that ability whenever opportunity presents itself. . . . The manual training room is better fitted than any other part of the school for the growth of self-reliance. The basis of self-reliance consists chiefly in the success of one's own efforts, and its strength is in direct proportion to the hardness of the difficulties surmounted. . . .

If I had the time to collect the evidence from the principals of the Chicago schools, I could easily demonstrate that manual training prevents truancy, holds boys longer in our schools, and helps children who are backward in their purely school (academic) work.

HENRY HOLMES BELFIELD

Principal, Chicago Manual Training School, School of Education, University of Chicago, Chicago, Ill.

NOTE. Born in Philadelphia, November 17, 1837; died, June 5, 1912. He was a graduate of Iowa College (now Grinnell), A.B., 1858; A.M., 1868; Ph.D., 1878. Tutor in Greek, Iowa College, 1858; superintendent of schools, Dubuque, Iowa, 1859–60, 1861–63, 1865–66; tutor in Latin, Griswold College, 1860–61. Served in the Northern Armies in the War Between the States, 1863–65. Principal of grammar school, Chicago, 1866–76; principal, North Division High School, Chicago, 1876–83; organizer and first principal, Chicago Manual Training School, 1883–1903; dean, University High School, University of Chicago, 1903–08.

My experience leads me to believe that manual training develops accuracy, truthfulness, and honesty to a much greater extent than merely the study of books. It must be evident to anyone who has seen a manual training school.

However, I believe that the faculties which are developed in a manual training school to a greater extent than any others, and to a much greater extent than they can be by the mere study of books, are judgment and will power.

I do not believe I can give instances in which "reformative" evidences have been produced through the influence of manual training, for the reason that I have never had charge of a reform school, and that I was always particular to refuse admission to the Chicago Manual Training School to any boy who seemed to be lacking in moral character. I can say, however, that I know of many instances in which boys who had no particular interest in ordinary schools have developed into earnest, hard-working boys, who have secured excellent results in scholarship through the influence of manual training.

GRANVILLE STANLEY HALL

President, Clark University, Worcester, Mass.

NOTE. Born at Ashfield, Mass., February 1, 1846; died, April 24, 1924. He was a graduate of Williams College, A.B., 1867; A.M., 1870; also of Harvard University, Ph.D., 1878. He studied

abroad at the Universities of Berlin, Heidelberg, Leipsig, London, and was the recipient of numerous honorary degrees. Professor of psychology, Antioch College, 1872–76; instructor of English, Harvard University, 1876–77; lecturer on psychology, Harvard University and Williams College, 1880–81; professor of psychology, Johns Hopkins University, 1881–88; president and professor of psychology, Clark University, 1888–1920. Active in scientific societies and author of important works.

I think everything depends upon the kind of manual training, and that some kinds now much in vogue are of little worth for the development of character.

Psychologically, the chief result is that motor training tends to close up the gap between knowing and doing, in which so many lives are wrecked.

The obverse side of it all is shown in the deteriorating effects of mere knowledge.

(To be continued)

Graduate Work in Industrial Education

JACK W. MORGAN
Assistant Professor
Department of Industrial Education and Art
Kansas State Teachers College
Pittsburg, Kans.

During the past five years or so there has been a tremendous increase in the number of students enrolled in graduate work at the master's level in the field of industrial education. A large part of this increase has, of course, been the result of the G.I. bill, but notwithstanding this fact an increasing number of nonveteran students are likewise striving for an advanced degree. Whereas in the not too distant past the acquisition of a master's degree was quite often thought of as a possibility, it is now usually considered as a normal, if not necessary adjunct to the bachelor's degree. The reason for this change in philosophy may be due in part to the influence and extent of the veterans program but no doubt in a large measure, it is due also to the stiffening of educational requirements in many states and cities as well as the general emphasis placed on the degree by administrators as a whole. Another important factor is that of salary differentials based on degree attainment.

Content of Graduate Work

With the preceding paragraph as a brief background to the current status of graduate work in industrial education, it is a reasonable supposition that both current and future graduate students should give serious consideration as to what the content and nature of graduate work is or should be. As for the points of general emphasis in graduate work the following are some of the most important. Among the first should be that of independent effort on the part of the student. That is to say — the student will in all probability be called upon to do considerable individual study and investigation in a variety of areas including many outside his specialty. It would be hoped that such readings and explorations would have a broadening effect as well as arouse the general curiosity of the student. Closely akin to independent effort is the matter of scholarship. While it is true that the abilities of students vary widely and "A" 's are awarded to only a small percentage of the total, one's ability should be no criterion for the amount of scholastic effort expended. Possibly it is trite to say that one should do his best, however good that may be, but certainly the attitude of just getting by can hardly be condoned. Seldom does one find in any field of endeavor persons who have been genuinely successful who have also had a complacent get-by philosophy. The ability to write well and clearly should receive considerable emphasis at the graduate level. One point of view as to how this may be accomplished will receive consideration in a subsequent paragraph. Finally, one should naturally expect considerable emphasis with respect to the entire field of industrial education and more specifically such areas as: history, philosophy, methods and techniques, organization and administration, tests and measurements, and possibly shop practice and technique.

Ability to Write and Graduate Work

To further develop the ability to write well and clearly has long been a general objective of all graduate work. It is the experience of the writer that graduate students in industrial education, have as a whole, been deficient in this respect. No doubt many others conducting graduate programs share this point of view. Whatever the cause of the shortcoming, it is certainly a plague to graduate students and professors. Traditionally, the master's thesis has been the final test of the student's ability to write and in general successfully attack, organize, and solve a problem as a result of his own initiative. Quite recently however, there has been a trend in the direction of eliminating the thesis and substituting in lieu thereof additional academic course work and a general comprehensive examination. Those favoring this line of deviation contend that the master's thesis is, after all, not really research but rather, a mere dabbling or adventure in typewriting. Such a description does, unfortunately, characterize the content of some theses and not necessarily just those of any particular locale. However, by what process of logic should we contrive to throw out the whole because of an occasional questionable part? To abolish the thesis requirement at the master's level is, to this writer at least, to destroy the most unique and challenging aspect of the entire

program. Nowhere in the total educational program is the student faced with the inherent conditions contained in the thesis requirement. Consequently academic courses and tests are by no means an equivalent substitute for a thesis conscientiously accomplished, and critically and objectively appraised. Administratively it is easy to understand why some colleges and universities have invoked the nonthesis degree since dealing with such large numbers of students confronts the graduate professor with an almost impossible situation with respect to the individual student and his thesis. However, it is logical to assume that any changes made in the graduate program would be for the purpose of improving the program and the product, not to make it easier for all concerned. The thesis is also of particular value to the student who is contemplating further graduate work at the doctorate level which of course includes the dissertation.

In summary, graduate work in industrial education should be specialized and specific with respect to subject matter while at the same time being broad in nature in attempting to tie the many parts of a total educational program into a coherent and unified whole. It should arouse the curiosity and intellect of the student and cause him to delve into new areas of knowledge and learning. Finally, it should contain a challenging element — something beyond and different from routine and formal courses of instruction.

PROBLEMS AND PROJECTS

FLOCKING GUN

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The parts for this flocking gun are readily available, and the project is quite readily made. One of its chief merits lies in the ease of changing from one color of flock to another merely by exchanging lids. The dimensions shown on Figure 2 may be altered to fit the jar and lid selected. Select a jar with a wide mouth and not too deep.

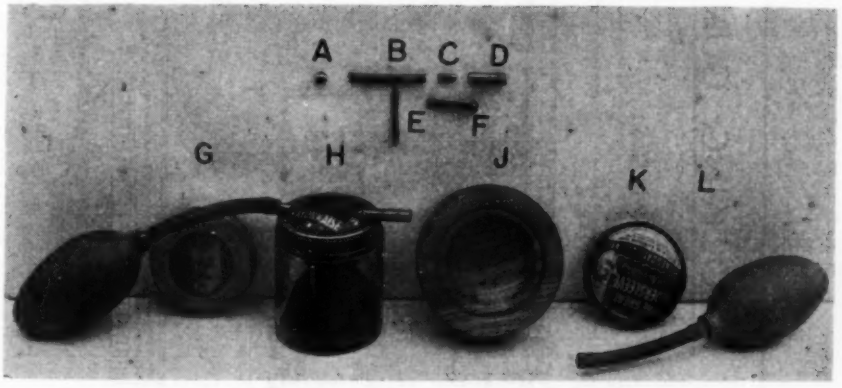


Fig. 1. Parts used in making the flocking gun

LIST OF MATERIALS

No. of pieces	*Material*	*Size*
1	Jar and lid, peanut butter, mayonnaise, or the like	
1	Copper or brass tubing	¼ o.d. x 3/16 i.d. x ¾ in. long
1	Copper or brass tubing	3/16 o.d. x ⅛ i.d. x 1⅝ in. long
1	Copper or brass tubing	⅛ o.d. x 1/16 i.d. x ⅞ in. long
1	Brass or steel rod	3/16 in. dia. x ½ in. long, or use a No. 8-32 machine screw
1	Compression sleeve	3/16 in.
1	Maple	2½ in. dia. x 1 in.
1	Atomizer bulb	
	Solder	

Procedure

1. Select a lid, like the one shown at *G* in Figure 1, that will fit the series of jars in which the various colors of flock are to be kept.

2. Turn a hardwood form, *J*, in Figure 1, in which to dome the lid. Doming the lid may be accomplished on a sandbag though better results are obtained by using the wood form.

3. Dome the lid, as shown at *K*, Figure 1, from the inside to within ⅛ to ¼ in. of the outer edge with a ball-peen hammer. Performing this operation with care will produce a smooth spherical form with a flat seat necessary for proper operation of the gun.

4. Cut the three pieces of tubing, *B*, *D*, and *E*, Figure 1, to length.

5. Flare the end of the ¼-in. tube, *D*, Figure 1, with a tube flaring tool. A punch may be used if the tube flaring tool is not available.

6. Machine nozzle *C*, Figure 1, and drill hole with No. 60 drill, or the nozzle may be made by drilling a length of No. 8-32 machine screw.

7. Drill 1/16-in. hole into the 3/16-in. o.d. tube, *B*, Figure 1, and solder the 1/16-in. tube, *E*, Figure 1, in place as shown. Then screw in the nozzle, *C*, Figure 1. If a number of guns are being made, a holding jig should be made for this soldering operation.

8. Drill lid and solder this assembly in place, as shown in Figure 2.

9. Solder compression sleeve to the end of the 3/16-in. tube. A bead of solder run around the end of the tube may be substituted for the compression sleeve.

10. Buy and attach the atomizer bulb.

11. Cut a washer to make the lid fit airtight, and assemble. The cardboard lining of the lid makes a good washer.

Operation

An understanding of the operation of the flocking gun will make its construction more meaningful. When the atomizer bulb is compressed air is forced through the 3/16-in. tube. Most of this air is blocked by the nozzle and diverted through the 1/16-in. tube thus stirring up the flock into a cloud in the jar. Some of the air passes through the nozzle at a higher velocity and, as explained by Bernoulli's principle, a low pressure area is formed between the nozzle and the ¼-in. tube around this high velocity air stream. This low pressure area causes the agitated flock to be pushed into it and is carried out through the ¼-in. tube.

The spherical top provides an opportunity for easy circulation of the flock all around the nozzle, thus resulting in a larger and more even flow of flock.

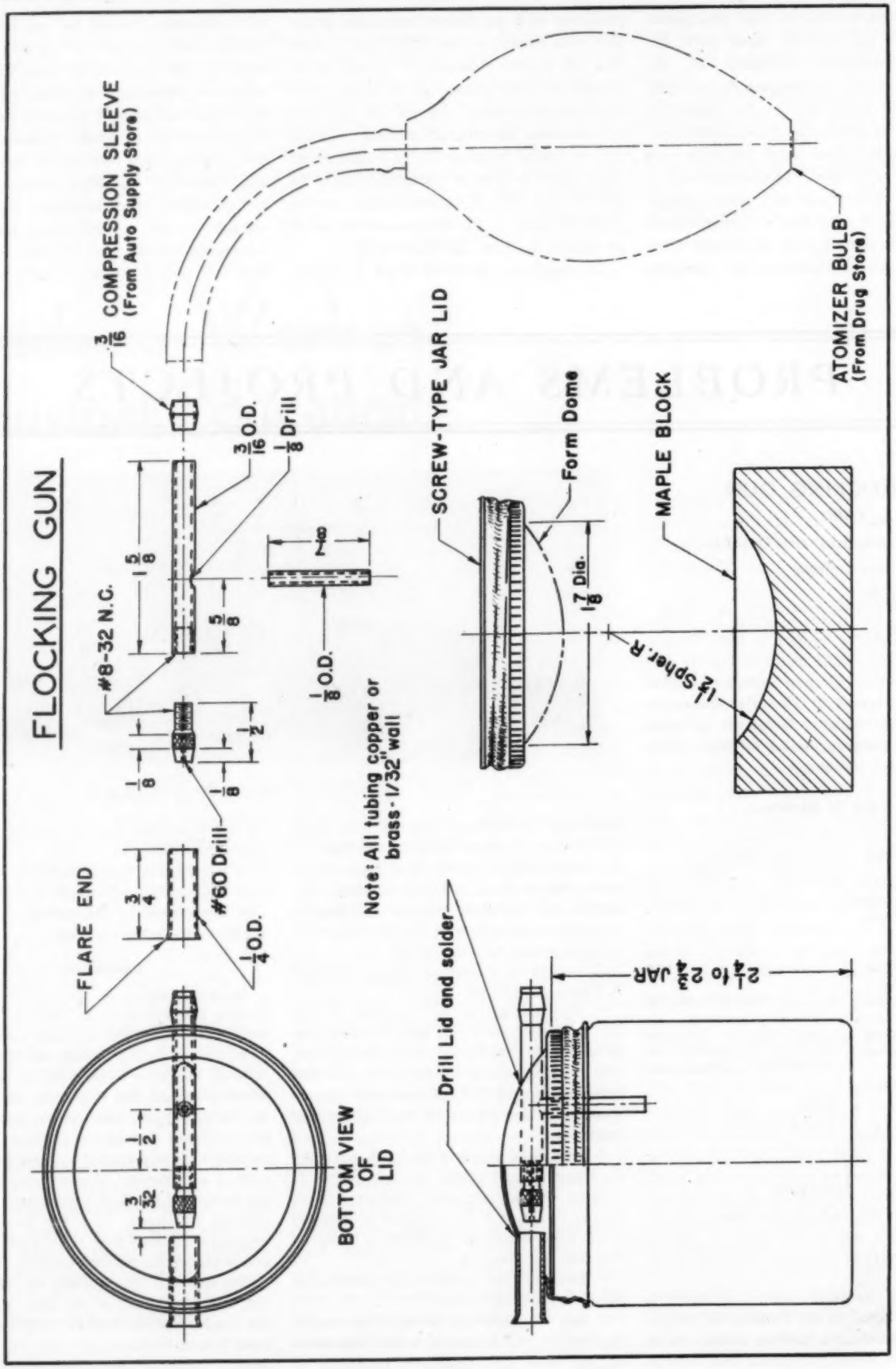


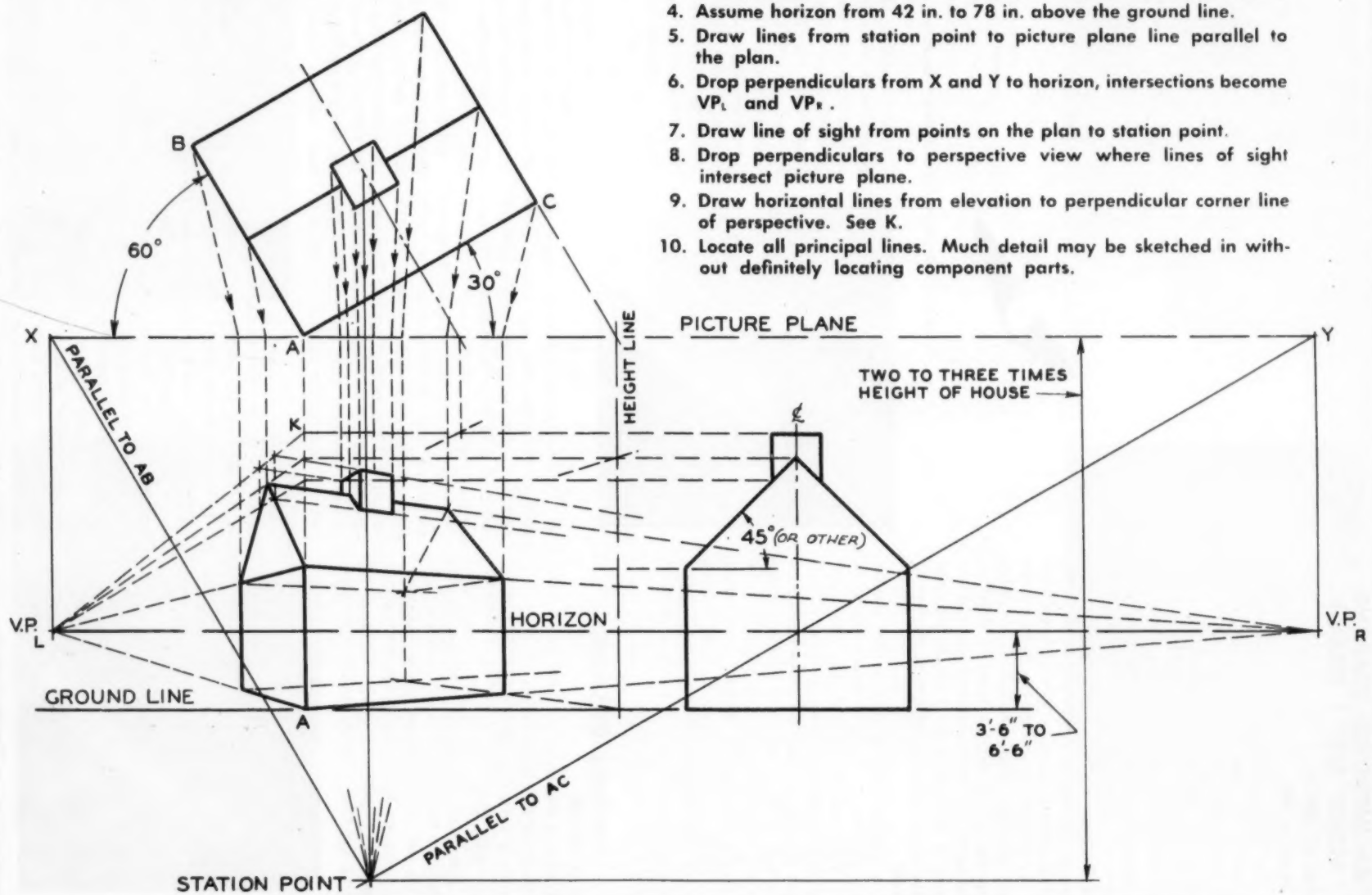
Fig. 2. Details of flocking gun

MECHANICAL PERSPECTIVE

George A. Willoughby
Michigan State Normal School, Ypsilanti, Mich.
— Drawing by R. F. Gilden, State Normal School, Ypsilanti, Mich.

METHOD OF PROCEDURE

1. Place floor plan at 30–60 deg. or 45 deg. to picture plane line.
2. Locate station point opposite center of drawing and about 2 or 3 times the height of the house away from the picture plane line.
3. Locate ground line where convenient so elevations lie in approximately middle 3rd distance between picture plane and station point.
4. Assume horizon from 42 in. to 78 in. above the ground line.
5. Draw lines from station point to picture plane line parallel to the plan.
6. Drop perpendiculars from X and Y to horizon, intersections become VP_L and VP_R.
7. Draw line of sight from points on the plan to station point.
8. Drop perpendiculars to perspective view where lines of sight intersect picture plane.
9. Draw horizontal lines from elevation to perpendicular corner line of perspective. See K.
10. Locate all principal lines. Much detail may be sketched in without definitely locating component parts.



Two-point perspective. Submitted by George A. Willoughby, Michigan State Normal School, Ypsilanti, Mich.

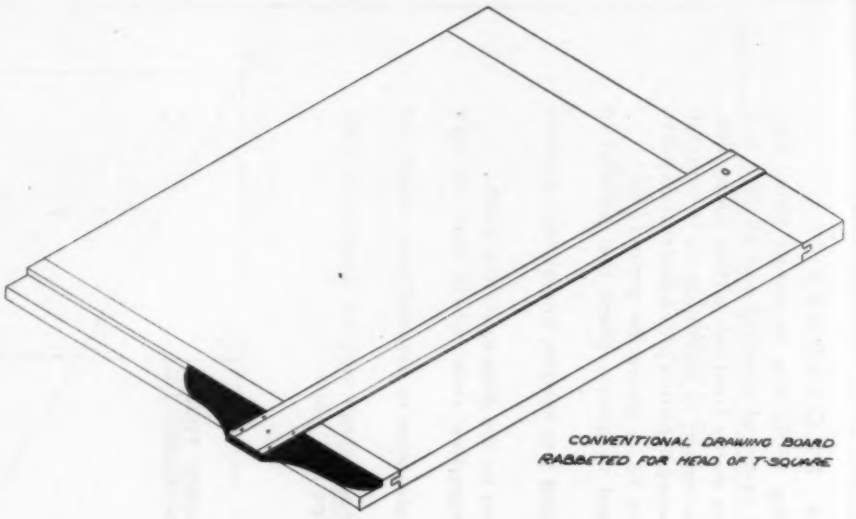
AN IMPROVED DRAWING BOARD AND T SQUARE

EARL D. HEATH
Towson 4, Md.

The problem of keeping the blade firmly secured to the head of the T square over an extended period of time is an ever present one in the drawing room. Repeated tightening of the screws which fasten the blade to the head soon results in loose fitting and consequently in inaccurate workmanship. Unnecessary downward pressure by the student on the head of the T square which projects beyond the edge of the drawing board is one of the primary causes for this loose condition.

An example of how this problem can be met and dealt with effectively is to rabbet the edge of the drawing board as shown in the accompanying illustration so that two surfaces of the head of the T square will come into contact with two surfaces of the drawing board.

A drawing board designed in this manner will give the T square a greater degree of rigidity while in use and will reduce the amount of damage caused by those students who exert unnecessary downward pressure on the head of the T square. It is recommended that a clearance of not more than 1/32 in. be provided between the bottom of the head of the T square and the edge of the drawing board. This will serve to permit the T square to move along the edge of the drawing board with a minimum of friction.



Improved drawing board and T-square

LAPPING OILSTONES

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Many tools and accessories are used in shop work but there are few which receive so little care and so much abuse as the whetstones, oilstones, or hones. There are many shapes and sizes of oilstones each to meet a special need. The most common shapes are rectangular, disk-shaped, and the many round and angular-edged slips. The very nature of the work to be done with them usually demands that their surfaces be maintained in the same condition as when new.

Fig. 1

Fig. 2

Students are frequently assigned the task of resurfacing oilstones by rubbing them on a concrete walk or floor or on a piece of coarse sandpaper. These methods produce inaccurate surfaces and are slow and discouraging. By the use of abrasive grain and a cast iron lap excellent results can be obtained in a relatively short time.

Much damage is caused by attempting to sharpen gouges, or other unusual-shaped tools on flat oilstones the surfaces of which are intended for straight-edged tools only. A round-edged slip stone is made for sharpening gouges and it is doubtful if a person is justified in the use of a large flat bench hone for that purpose. Reserve the bench hone for sharpening straight-edged tools — the slip stones for gouges. Figures 1 and 2 illustrate the proper method of using the slip stone for honing a wood turning gouge. Figures 3 and 4 show how the same operation is performed on a bent shank paring gouge.

When the surface of an oilstone has been gouged or hollowed it cannot sharpen tools such as wide chisels and plane bits without rounding their corners. Oilstones are frequently seen whose center areas have been worn 1/8 in. below the ends. The proper use of an oilstone would prevent such damage. The person using the oilstone should fasten it securely so that it cannot move while in use. His position should be at the end of the stone and not beside it. The operator who stands at the side of a rectangular oilstone while sharpening a chisel, plane bit, or similar tool, Figure 5, will use the center area only. He should fasten the oilstone in a vise and stand at one end of the stone. Both hands would then be free to hold the bit or chisel and he could use all of the face of the stone as shown in Figures 6 and 7. If the oilstone is used in this way the wear will not be concentrated in a small area.

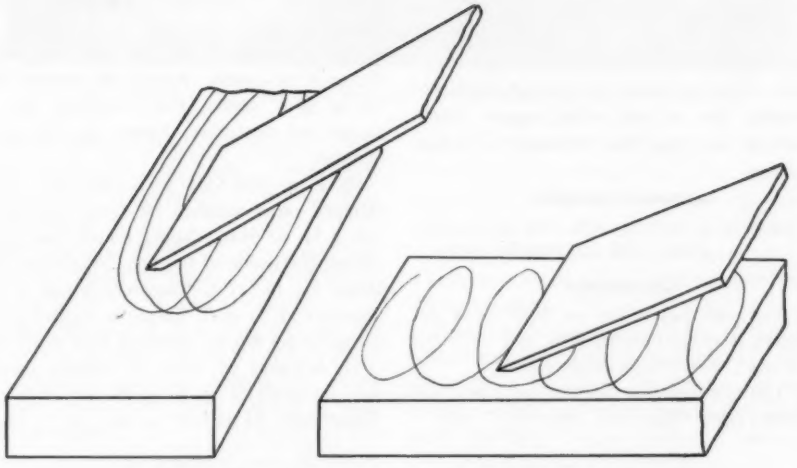
Oil is used on a hone to prevent metal particles from clogging and glazing the surface. At the same time that the oil lubricates the surface, the small metal particles float in the oil film and may later be wiped from the stone. Fine-textured stones such as the hard Arkansas should be used with a very thin-bodied oil because the heavy oils form a thick film and it is with difficulty that the metal is brought into contact with the surface of the stone for whetting. India oilstones and others of that type require the use of oil of about 10 S.A.E. viscosity. It is common practice to take 30 S.A.E. oil and dilute it with an equal amount of kerosene.

When the surface of an oilstone has become hollowed or rough it is wise to recondition it. With little equipment and material the surface of the oilstone can again be made nearly perfect. The first requisite is a lap, preferably of cast iron, grooved as shown in Figure 8. For an average-sized bench oilstone, the lap should

Fig. 3

Fig. 4

be about one inch thick and eight or ten inches square. Any flat surface of cast iron can be used such as large stove lids if they are flat. The lap need not be an elaborately machined article though a machined surface is desirable. Cast iron is used because of its low cost and availability. Its surface when machined is porous which provides innumerable small pits in which oil and abrasive grains become lodged and add to the efficiency of the lap. It is recommended that diagonal grooves about 3/32 in. deep and wide, spaced at about 3/4-in. intervals, be cut into the surface of the lap. The grooves will catch and hold abrasive grains so that movement of the oilstone across the surface will not force the abrasive material off the lap, but will continually recharge the surface of the lapping plate.



(At left) Fig. 5. Improper. (At right) Fig. 6. Proper

Abrasive material of good quality is suitable for this operation and can be obtained in grades from very coarse to very fine. Care must be used when lapping a fine-textured oilstone to prevent the embedding of coarse grains in its surface. One coarse grain could do considerable damage to a fine edge or surface. A safe policy to follow is to use abrasive grain of about the same degree of coarseness as the object which is to be lapped. Silicon carbide and crystalline alumina are satisfactory abrasives and may be purchased in a large range of grain size. Crystalline alumina of No. 60 grain size will satisfactorily lap an India oilstone of the type commonly used for sharpening plane bits and chisels. Grain size No. 150 or finer will be suitable for hard Arkansas stones. If lapping is to be done with fine abrasive grain, all coarser grains should first be removed from the lap by careful cleaning. Special care must be used to clean the grooves and edges of the lap. These abrasive grains can be purchased from foundry supply houses.

The actual process of lapping is simple. Place about a teaspoonful of abrasive grain on the lap and add enough light oil, kerosene, or benzine to form a pool which would cover about half the area of the lap. Mix the oil and the abrasive grain, place the uneven surface of the oilstone in the pool and with considerable pressure from the hands rotate the stone on the lap as shown in Figure 8. Use the entire surface of the lap but avoid forcing the oil and abrasive from the lap's

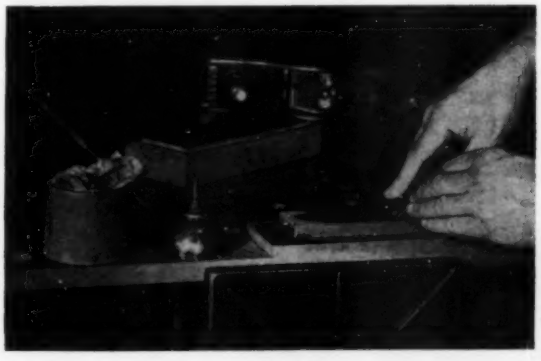


Fig. 7

Fig. 8

surface. Continue lapping until more abrasive grain must be added or until the desired results have been obtained. The faces and edges of slip stones may be conditioned in like manner. It is advisable to lap oilstones frequently rather than to make a great deal of lapping necessary at any one time.

JIG FOR MAKING ASH TRAYS

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New York City

1. The jig described herein is one that will last, save much time, and it will serve to make hundreds of ash trays or pin trays. It also keeps the metal straight and eliminates annealing. Hot or cold rolled copper, brass, pewter, or aluminum may be used for making the trays.

MATERIALS REQUIRED

2 pieces of ¼ by 4 by 4-in. cold rolled steel
4 ¼ by ½-in. r.h. machine screws

Operations

1. Lay out ¼-in. line on four sides for clamping screws. Centerpunch and drill top plate only, with ¼-in. clearance hole.

2. Clamp two plates together and spot holes on lower plate. Then drill with No. 7 drill.

3. Tap lower plate for ¼-in. 20 n.c. machine screws, and secure top plate to bottom one.

4. Mark off a 2¼-in. square centrally located.

5. Lay out the smaller square for drilling cutout. Larger holes should be drilled in corners.

6. Use a drift punch or an old hack-saw blade ground to shape for cutting out the center portion.

7. File all drill marks smooth to the line, leaving the corners round.

8. Separate the two plates after marking with centerpunch, and file a ⅛-in radius on the inner face of the square. This prevents the cutting of the tray when being worked upon.

9. Cut the blank for the ash tray either 3½ or 4 in. square. Round the corners to a ½- or ¾-in. radius. Place between the two plates and centralize. Screw the two plates together.

10. Place the jig with the tray blank clamped on a sandbag or some newspapers. Use a ½- or ⅝-in. dapper punch, and punch around the inside of the tray. Space the blows about 1/16 in. at a time, continuing in one direction all around. Keep the dapper punching until the desired depth of tray is attained.

11. A series of holes for dapper punches may be made ¼ in. from the square cutout. These may be either 3/16 in., or ¼ in., as desired. They may be ⅜ in., or ½ in. apart.

12. Dapper bumps around the tray should be put in from the bottom, so as to get the bumps sticking up on the tray.

13. Unclamp the jig and you will have a very nice looking tray, which may then be planished with a peening hammer on the inside. Steel wool and buff on a small wheel. Or you may give it an antique finish with liver of sulphur. Lacquer may be applied to protect finish.

PREVENTING EYE INJURIES IN THE SCHOOL SHOP

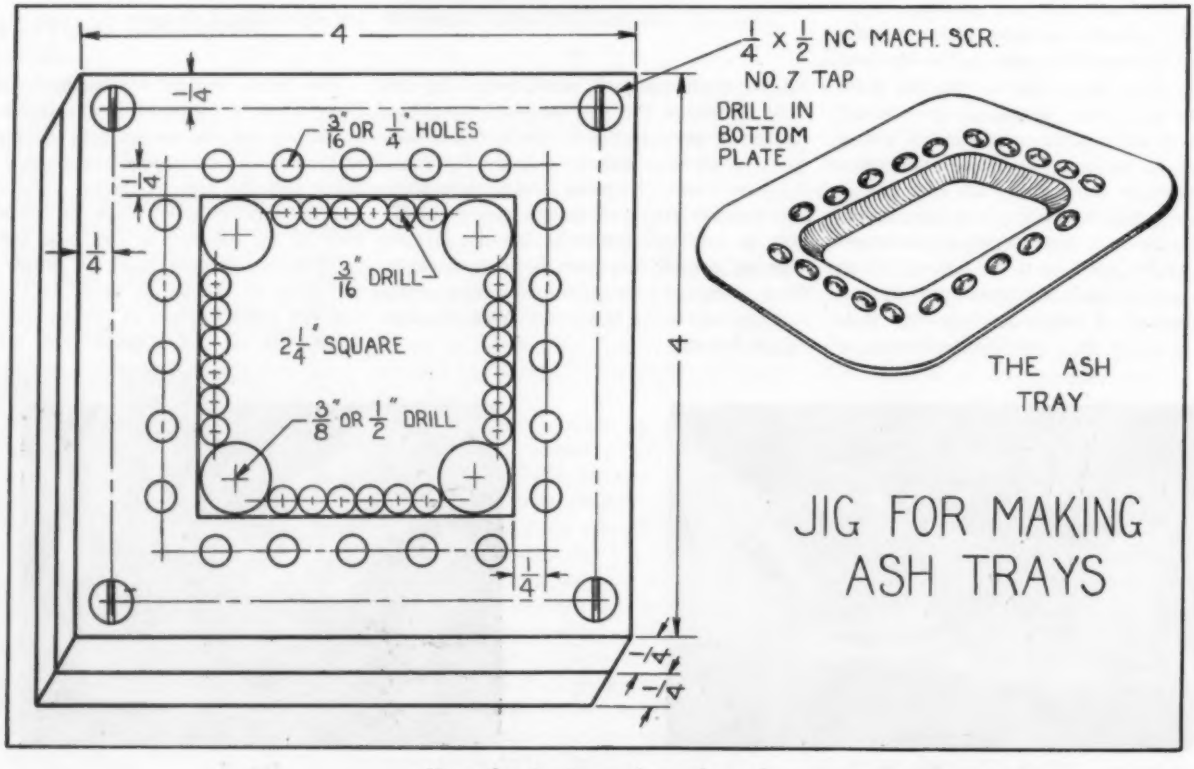
JOHN A. HOWLAND

New York City

Certain projects in industrial arts expose the students' eye to injury more than others and the training schools of the nation subject a large percentage of their young people to eye injury every day. Almost every phase of shopwork entails constant exposure of the eye. Losses due to eye injury, no matter to what degree they may prove disabling, are costly to both institution and student.

The average frequency rate of disabling eye injuries per man has been put at 0.67 man hours in industry. Owing to the nature of school shop operation, these figures will prove significant to the instructor.

The school shops of this country as a



How the jig is made and used

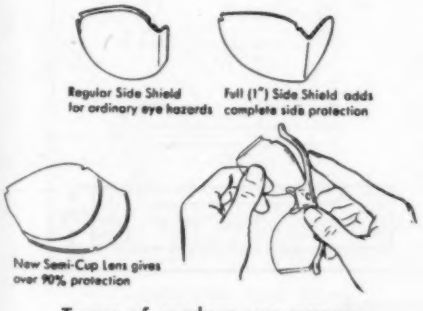
whole have always been willing to adopt preventive safety measures and methods, including the use of safety goggles. But, in many of these places, teachers and supervisors are not keeping accidents to a minimum because the eye protection they are providing is not adequate. Not enough care has been taken, in many cases, in selecting the right safety goggles for the job.

Certainly the eyes of our student workers will have to be given extraordinary protection if we are to get the results expected. For too long, however, some schools have supplied their students with old style goggle designs, being evidently unaware of the vast developments of the postwar era brought about in goggle design and goggle research work.

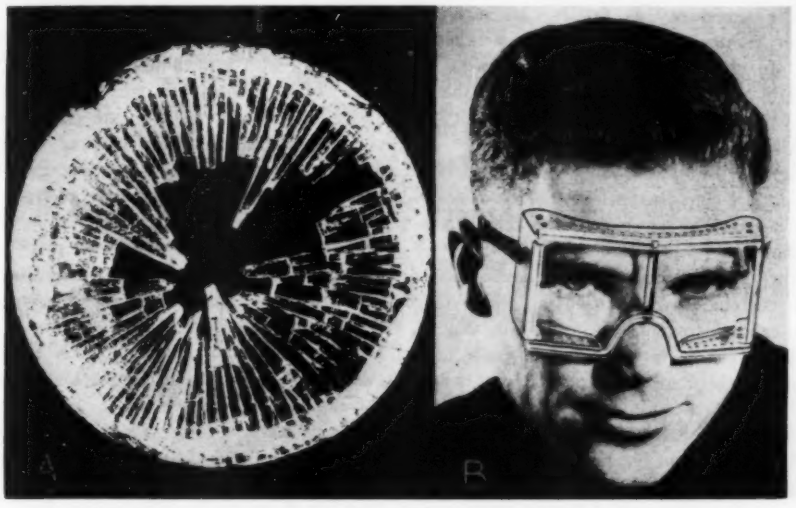
Teachers and administrators should realize that great progress has been made in designing safety goggles for almost every need. For instance, only ten years ago the only chipper's goggle available was the old dual-cup design. Today several types of plastic cover-all goggles and a semi-cup tuckaway goggle are available which assure infinitely better protection. The same is true of goggles for many other uses.

The objective of the teacher who wants to reduce eye accidents must be above all to select the type of modern improved goggle best suited to the individual job involved. This is especially important now, when the defense production program is getting under way throughout industry and more young people must be trained. This writer has found that industrial plants and others requiring the protection of safety goggles are closely re-examining this whole problem of goggle selection.

How shall the school shop go about best meeting its needs from among the means of eye protection available today? First of all, the instructor must see that the goggles are designed for comfort so that the student will be willing to wear them when necessary on the job. That means that they must be light, fit properly and meet recognized standards of optical quality. Next, he will see that the goggles selected have passed all government tests and also that they are made for long wear. Then, he will consider the important question of the material to be used. Will the goggles be made of plastic or of glass? (Suggested reading on this topic, *Plastics On Guard*, George T. Metcalf Co., 68 So. Main St., Providence, R. I.)


Regular Side Shield for ordinary eye hazards
Full (1") Side Shield adds complete side protection
New Semi-Cup Lens gives over 90% protection

Types of modern eye savers



A — Glass lens, steel ball impact; B — All molded plastic frame

Regarding the plastic or glass question, plastics are becoming more and more widely used for purposes of eye protection. It is time that we paused and take stock of the effectiveness of this material. How do plastic lenses compare with those made of glass? Are they better than glass? Are all plastics equally suitable?

What are the advantages, if any, of plastic safety goggles? The question may be answered thus: (*a*) Plastics are light, and accordingly bring more comfort to the wearer. (*b*) Because of their structural qualities they better resist many of the dangers to which the student is exposed.

E. A. Ring, treasurer, Watchmoket Optical Co., who has played an important part in these new plastic developments said to the writer:

"Plastic eye protection has finally reached the important position in the shop safety field it has long deserved. It has consistently proved itself in industry by meeting the most rigid job requirements. In order to satisfy most job requirements, eye protection must be safe, comfortable and good looking (highly styled). The latter two points are considered very important by teachers who want to induce more workers actually to wear the goggles which are provided. Eye savers made of plastic satisfy all of these job requirements."

Today the plastic type goggle is supplied in various styles and types — each designed to give maximum protection at a specific job — as, for instance, the cover-all, face shield, and tuckaway designs.

The National Safety Council stated in recent reports: "The all plastic safety goggle has been viewed with increasing favor during recent years in the shop field. The lens area is generally larger than in the usual industrial goggle. Various types of side and top shields ward off particles coming from any direction, but at the same time the shields are made of transparent plastic which permits unobstructed light transmission."

These plastic goggles have the further advantages of being light in weight and of being adaptable in the larger sizes to use as cover goggles. When so worn, this outer plastic goggle protects ordinary corrective spectacles as well as the eyes from flying particles.

Plastic side shields for various types of industrial shop goggles are recommended for many occupations where small flying particles are involved as in the machine shop. In many cases they have successfully met the objections of employees to side shields of other materials which obstruct the vision, are heavy, or are uncomfortable to wear. These shields may also be tinted to reduce possible side glare.

One of the most successful uses of plastics for eye protection has been in the manufacture of face shields. In many cases, protection is needed for the whole face, unusual atmospheric conditions cause goggles to become fogged, or a face shield is more acceptable to a student. Face shields are made in a variety of lengths for different degrees of facial protection. However, when the adoption of curved face shields is contemplated, they should be critically examined for possible distortion.

As both research and practical applications have shown, each kind of plastic has its own area of use and its own limitations. As a group, plastics can hold their own with glass against impact hazards at ordinary temperatures, but they are less successful at low temperatures, and in at least two cases they are better at high temperatures. They have a

definite superiority as far as molten metal splash, high-velocity impact and some chemicals are concerned; they are inferior in respect to abrasion, or sharp impact, and should be avoided whenever there is a possibility of injurious light radiation.

Most of the plastics which have been used for optical purposes belong to the thermoplastic group, as contrasted with the thermosetting group which hardens into shape by cooling. Until quite recently, thermoplastics were unsuited to applications in which they were exposed to temperatures of 160 deg. F. or higher. Newer developments, however, have improved thermoplastics to the point where they are less susceptible to softening at higher temperatures.

The plastics which have properties most suitable for eye protection purposes are vinyl resin, allyl casting resin, cellulose acetate, and methyl methacrylate. The vinyl resins are among the more recent compounds to attain commercial importance in this country. They are derived mainly from acetylene which is reacted with acetic acid or hydrogen chloride, and they appear in a wide range of rigid and elastic forms.

In order then, to attain maximum eye protection for the students, each instructor and supervisor should follow this procedure:

1. Analyze the eye hazards prevalent in a given shop.
2. Select the most modern, improved eye savers available for maximum safety.
3. Choose a comfortable, good looking goggle that students will wear.

The cost of eye disablements as reflected in workmen's compensation alone, is about $50,000,000 per year in industry. To this must be added loss through inefficiency after injury or loss of sight.

It will thus be seen that inadequate eye protection costs a great deal and that the way for the teacher to keep the eye accident costs in his shop to a minimum is to realize that safety goggles must be selected to fit the job they have to do.

Because there are many different types of eye savers each of which is best adapted to a given job, the accident reduction effort requires close study and wise selection of correct eye protection based upon all known facts.

METAL CANDLESTICK

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East Orange, N. J.

Wood and Art Metal Shop Job Sheet

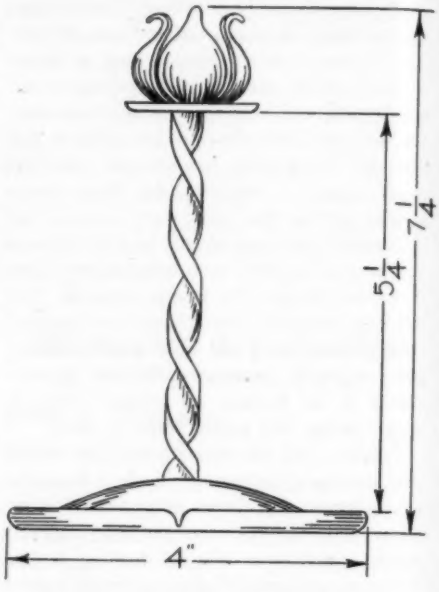
Procedure

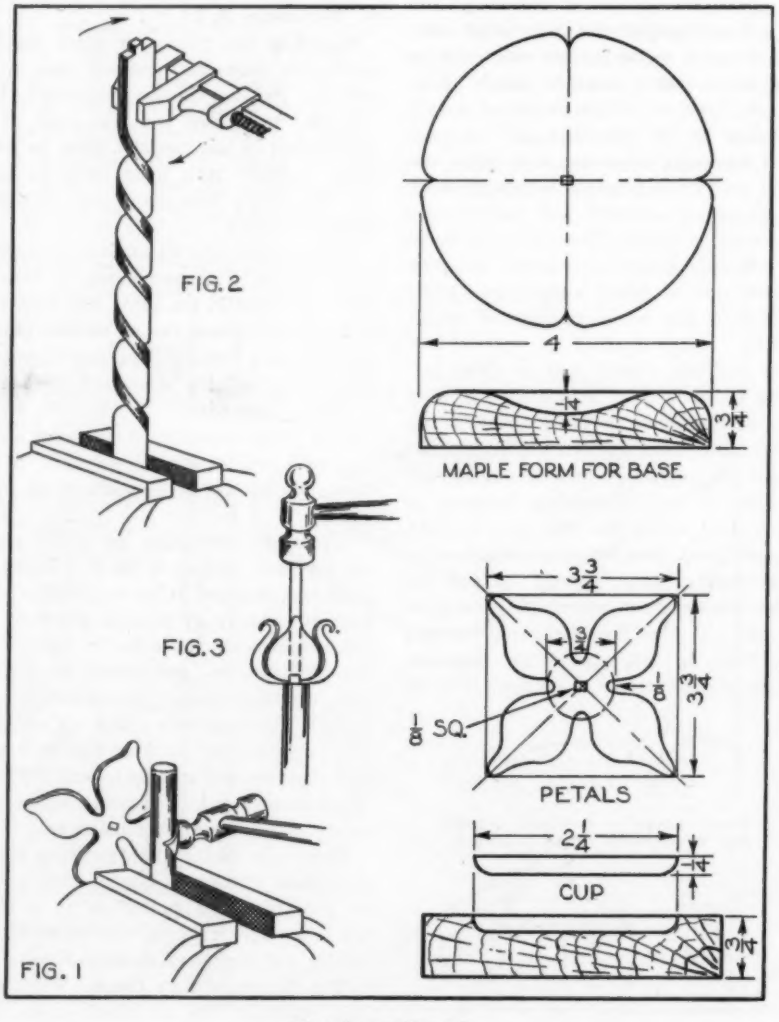
1. For the base make a 4-in. circle, with dividers, on a piece of 20-ga. iron or copper. Cut with tinner's shears. Peening of the surface is optional. File edge smooth and shape on a form with a rawhide mallet.

2. Petals and saucer are both made of 20-ga. iron or copper. For the petals cut a piece of metal 3¾ by 3¾ in., and make an outline of design. Strike a center punch hole where the diagonal lines intersect. From the center scribe a ¾-in. circle and lay out locations for drilling four ½-in. holes for convenience in cutting out the petals. Cut out petals with a jeweler's saw and file smooth. Drill center hole and file for a ½-in. square for rivet to fasten on the stem. Next shape the petals as shown in Figure 1, and form the cup.

3. Cut metal for the saucer 2½ by 2½ in. After scribing and cutting out the circle, file the edge. Shape in form made for the purpose, as shown in the illustration. Drill hole and file ½-in. square for rivet.

4. The post, or stem, is made from a piece





Metal candlestick

of iron or copper bar 3/16 by 3/8 by 6 in. A 1/8 by 1/8 by 1/8-in. square is sawed out and filed on both ends to serve as a rivet for top and bottom pieces. The material is now ready for the twist which is done with a monkey wrench. Set the stem up in a machinist's vise, protected from the vise jaws by copper pieces and twisted one complete revolution in the direction shown in Figure 2. If material is copper, anneal before twisting.

5. To assemble the parts start by riveting the bottom piece to the stem. Clamp the stem in vise, protecting sides with soft pine, having the lower end of stem resting against bottom of vise. Rivet the base to stem. Next slip the saucer and flower design over the top, rivet and place bottom end of stem on a properly supported surface, such as a large ball-peen hammer clamped in the vise, face up. Then rivet with a flat punch as shown in Figure 3.

6. For finish, if the candlestick is made of iron, black lacquer is commonly used. With copper, the job could be either a bright or antique finish. Both cases require a coat of clear lacquer.

LAMINATED FRUIT BOWL

MARTIN J. GAYHART
Student, Nebraska State Teachers College
Chadron, Neb.

In the industrial-arts shop there are many scrap pieces of material. These can be used in making laminated articles. The laminated fruit bowl, shown in the illustration, was made from walnut and maple scrap pieces. The author made this project while taking advanced woodwork in the Nebraska State Teachers College at Chadron, Neb. It is a very interesting project, and gives a great deal of experience in the procedures and use of tools. This bowl can be made of any size to fit the scraps you have available; however, one should always remember to use good proportion.

HANDY GLUE APPLICATOR

GLENN E. MARION
Department of Industrial Arts
Central High School
St. Joseph, Mo.

The application of glue to projects in the wood shop is often a wasteful and messy job with most students.

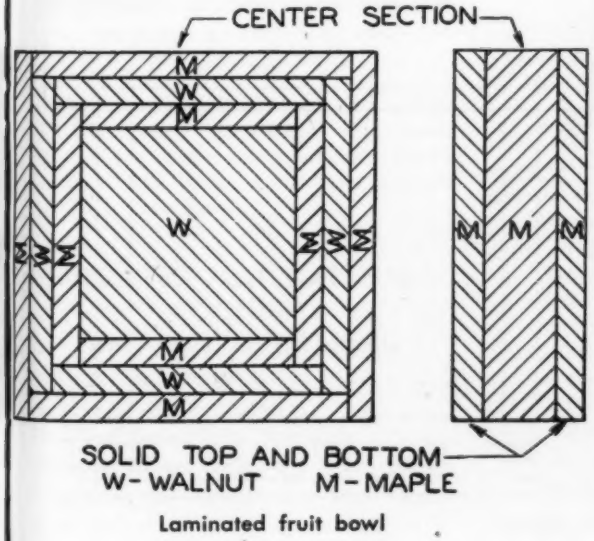
The handy applicator shown in the illustration has proved very successful in our school shops. A common hydraulic pump oil can controls the amount of glue to be used and it also places it in the desired spots with little waste. It will be necessary to use cold glue instead of the common hot glues because the latter would soon harden in the can.

"Wood-Lok," a cold glue made by the National Adhesive Company, Chicago, Ill., works very satisfactorily. It does not set up in the can and will often stay two weeks before the can needs cleaning.

The oiler should be washed out with hot water each week in order to prevent the spout and pump from clogging.

The same amount of electricity needed to produce five tons of aluminum will keep the lighted torch in the Statue of Liberty's hand burning for one entire year. — *Aluminum Company of America.*

Handy glue applicator



Laminated fruit bowl

Laminated fruit bowl

WREN HOUSE WITH CLEAN-OUT DRAWER

DICK HUTCHINSON

San Gabriel, Calif.

Pictured here is a birdhouse, that may be readily cleaned, and which adds charm to any lawn or garden.

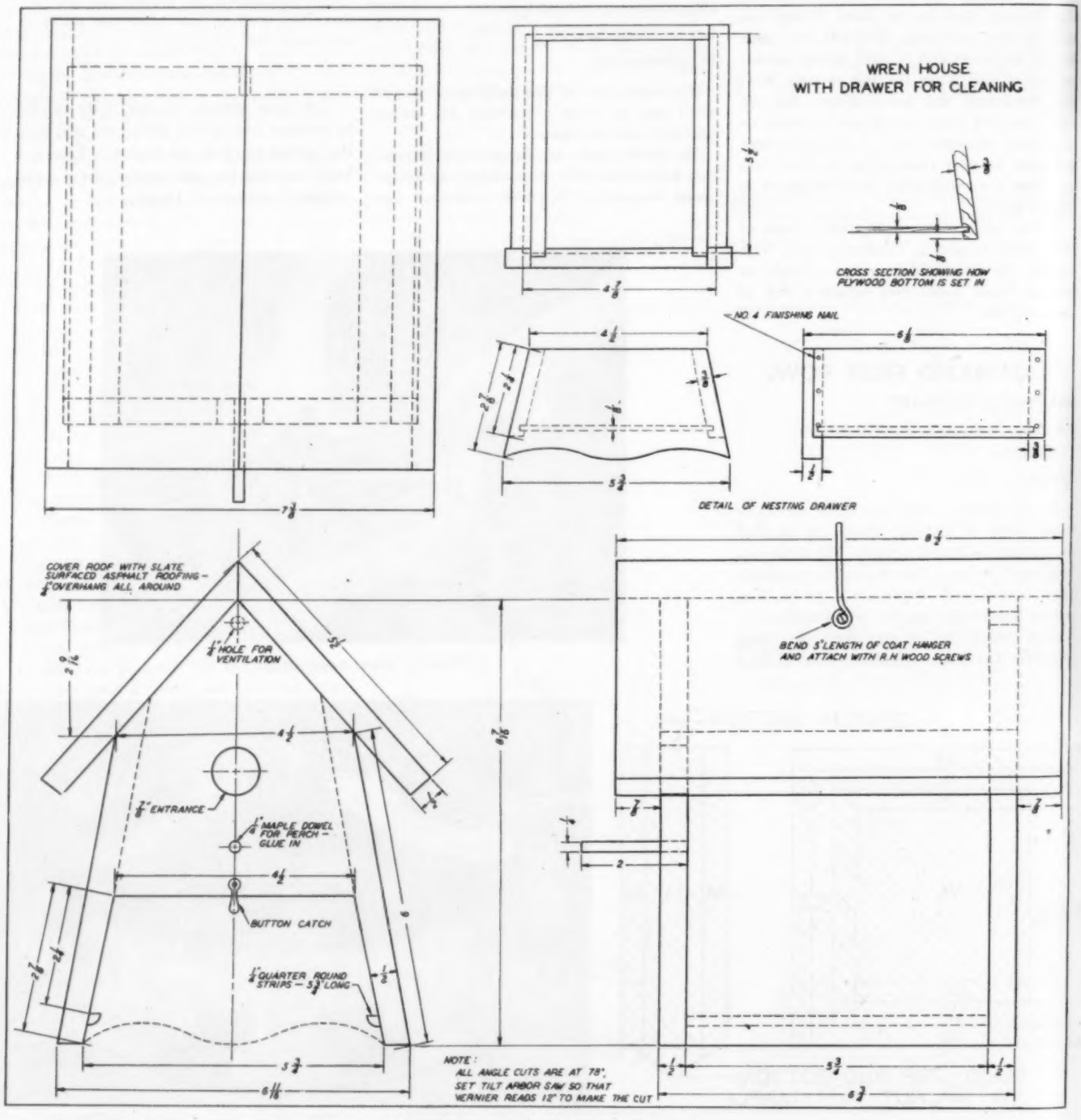
The same type shelter — with the drawer — may be made with straight side walls if one does not care to carry out this particular design, and although not as attractive it will be just as serviceable.

The house itself and the drawer front are all of ½-in. white pine. The sides and back of the drawer are of ⅜-in. material, and the set-in bottom is of ⅛-in. plywood.

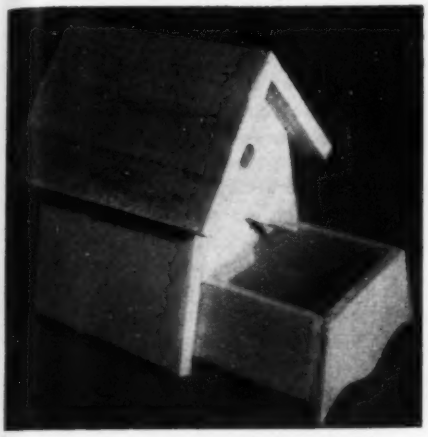
All of the angle cuts may be made on the power saw. All are cut on an angle of 78 deg. The miter guide is also set at 12 deg. for making the diagonal cuts. The curves are cut on the jig saw, or a band saw may be used.

When all of the parts have been cut and fitted, assemble the house with resinous glue and 4*d*. finishing nails. Cut the ⅞-in. entrance opening and drill the hole for the perch. The ⅜-in. dowel perch is glued in and a ¼-in. hole is drilled in the back just under the roof for cross ventilation.

Set the drawer in position and glue and nail


WREN HOUSE
WITH DRAWER FOR CLEANING
CROSS SECTION SHOWING HOW PLYWOOD BOTTOM IS SET IN
NO. 4 FINISHING NAIL
DETAIL OF NESTING DRAWER
COVER ROOF WITH SLATE SURFACED ASPHALT ROOFING — ½" OVERHANG ALL AROUND
¼" HOLE FOR VENTILATION
⅞" ENTRANCE
¼" MAPLE DOWEL FOR PERCH — GLUE IN
BUTTON CATCH
¼" QUARTER ROUND STRIPS — 5¾" LONG
BEND 5" LENGTH OF COAT HANGER AND ATTACH WITH R.H WOOD SCREWS
NOTE:
ALL ANGLE CUTS ARE AT 78°.
SET TILT ARBOR SAW SO THAT VERNIER READS 12° TO MAKE THE CUT

Wren house with clean-out drawer



Wren house assembled, painted, and ready for asphalt roof

on the two ¼-in. quarter round strips that guide the drawer.

Paint the house any color desired, then apply the asphalt roofing. A good combination is a cream color house with a red roof, or a white house with green or gray roof. Finally, attach a small button catch to hold the drawer in place.

Wren house hung in tree and ready for occupancy

The same design may be used for building a bluebird house. The bluebird house should have a 1-in. larger nesting area, and should be about 1 in. higher, and the opening should be 1½ in. in diameter.

RELATED MATERIAL FOR FOUNDRY AND PATTERNMAKING

HARVEY D. MINER
Industrial-Arts Instructor
Bowling Green State University
Bowling Green, Ohio

1. When the casting has cooled, remove from the cooling area of the foundry.
2. Remove all sand from the casting with a wire brush.
3. All sprues, anchor pins, risers, or fins should be removed with a hack saw or knocked off with a ball-peen hammer.
4. If the specifications do not call for a machined surface, remove all rough parts on a grinding wheel.
5. Never use the regular grinding wheel for working the rough casting. The grit will clog in the case of soft metals and will wear away unduly in the case of harder metals.
6. Soft metals can be easily worked with a coarse file or rasp.
7. Sand or blow holes are often found in castings. These may be filled with solder, welding, or filler, depending upon the kind of metal used in making the casting.
8. Machinery is used most frequently for finishing the harder metals such as iron, steel, etc.
9. Hand work is required on most small castings to assure a good finished surface.
10. All tool marks should be removed from a surface. A beautiful surface is often marred otherwise.
11. Many rough production castings require rough finishing only.
12. All machine work should be to precision dimensions and accurate in all respects.
13. In many cases greater accuracy and beauty can be attained by scraping a surface.
14. Variations on surface decoration may be had by varied procedures.
15. Remember the final finish is the test of a good usable project.

COMMON METALS USED IN THE FOUNDRY

Metal	*Melting temperatures*	*Shrinkage per foot*
Tin	450	1/12 in.
Cast iron	2600	1/8 in.
Brass	2300	3/16 in.
Bronze	1800	3/16 in.
Aluminum	1200	5/32 and 3/16 in.
Steel	2300	1/4 in.
Zinc	788	5/16 in.
Lead	621	3/8 in.

Temperatures are given in Fahrenheit readings and are to the nearest one hundred degrees.

Suggested Projects

The following list of projects may be incorporated in the program if the time and materials will permit. If the program is to be a very extensive one, a wide variety of projects may be selected.

1. Candlestick base
2. Candle holder (split pattern)
3. Name plaques
4. Wall plaques
5. Book ends
6. Door knockers
7. Small machine parts
8. Small industrial projects

Questions for Study

1. How is iron extracted from its ore?
2. What is cast iron?
3. How is cast iron made?
4. How does steel differ from cast iron?
5. List several soft metals which can be used in a small school foundry.
6. Describe several ways metals can be shaped beside casting.
7. Differentiate: a cored hole, drilled hole, bored hole, and a reamed hole.
8. Explain how to light and operate a nonferrous furnace.
9. Describe the operation of an iron cupola.
10. Describe the operation of a blast furnace.
11. What is an alloy?
12. Why are we concerned about alloys?
13. What is a Pyrometer?
14. What metals can be checked with a Pyrometer?
15. How are the temperatures of the other metals checked?

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GLOSSARY OF COMMON TERMS

Pattern: The wood or metal form of the object to be cast.

Flask: The complete molding box. It has two parts: the cope and the drag.

Cope: The top half of the flask. It has the aligning pin guides.

Drag: The bottom half of the flask. It has the aligning pins.

Core: The sand form which, when placed in the mold, will leave a recess or opening in the casting.

Core Box: The box in which the core is formed.

Sprue: The hole in the mold through which the metal is poured to form the casting.

Sprue Pin: The wooden or metal form which makes the sprue hole in the mold.

Gate: The channel through which the metal travels from the sprue to the mold recess.

Mold: The recess made in the sand by the pattern.

Draw Pin: A metal screw or pin used to draw the pattern from the mold.

Fillet: Material which builds up the inside corners of a pattern.

Finish: The allowance made on a casting for machining.

Ladle: The container used to transfer the hot metal to the mold.

Crucible: A large container used to carry metal from the furnace to the mold.

Cupola: The furnace in which cast iron is heated to the molten state.

Riddle: The screen used to sift the sand over a pattern during the molding process.

Slick — Spoon: Tools used to make repairs on a mold before pouring the casting.

Jaggers: Wood or metal angles to aid in holding the sand in the cope.

Chaplets: Metal supports for cores.

Chills: Material used to conduct heat rapidly from certain section of a mold. Usually metal.

Tuyere: Small openings at the base of the cupola through which air is forced.

Tumble Barrel: Barrel in which castings are rolled to clean them and remove sharp edges.

Bentinite: Chemical added to molding sand to give it more bond.

Pyrometer: Instrument used to test high temperatures.

Draft: Taper on a vertical surface of a pattern to facilitate drawing from the mold.

Parting Line: The surface where a pattern separates.

Spider: Pattern construction on a wheel where the spokes radiate from a central part.

Stop-Off: Additions to a pattern to support thin and delicate patterns.

Master Pattern: The pattern from which a metal pattern is made.

Metal Pattern: A pattern made of metal.

Shrinkage Rule: A scale calibrated to compensate for the shrinkage of metals.

Core Prints: Additions to a pattern which form a seat for a core in a mold.

Split Pattern: A two-part pattern usually parting in the center.

Rapping Plates: Metal plates countersunk in a pattern to make drawing easier and prolong the life.

Template: A piece of thin stock cut to a specified shape used for checking and testing.

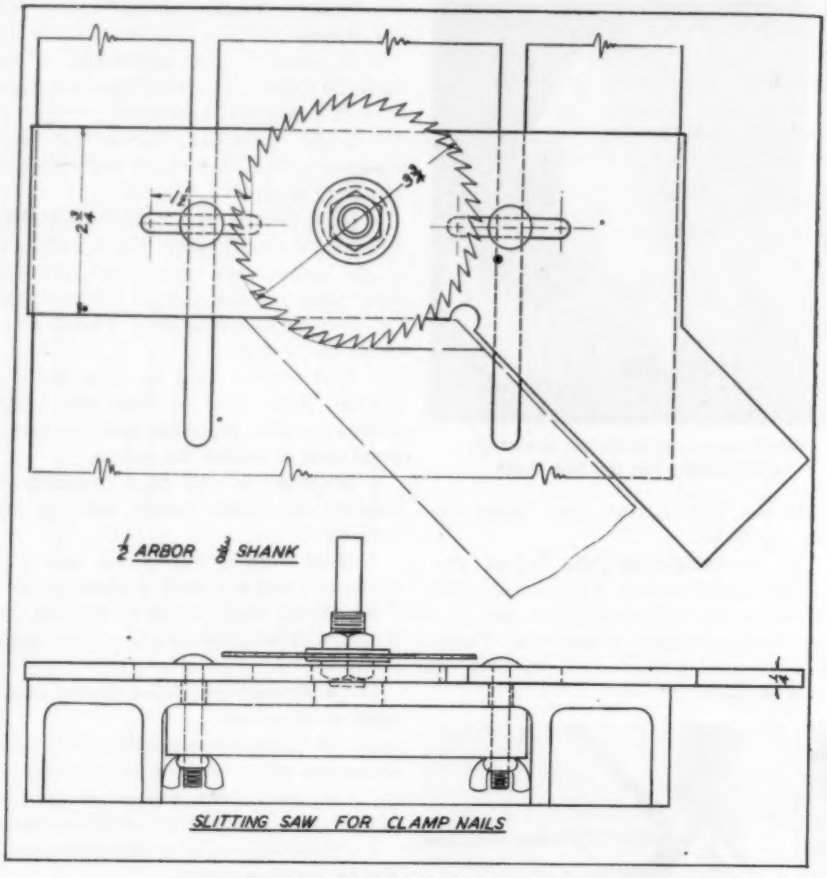

Fig. 1. Detail of slitting saw

SLITTING SAW FOR CLAMP NAILS

NORMAN BROOKS
Penn High School
Greenville, Pa.

With the advent of clamp nails for miter joints instead of wood splines, we are faced with the necessity of finding a mechanical device to do a precision job in sawing. Hand cutting with a fine tooth saw on a jig is slow and at times inaccurate, but with the device shown in Figure 1, you or your students can do a precision job.

A standard slotted drilling table is shown, in part, with guide device made out of ¼-in. plywood and a 45-deg. stop at the right. This guide has slotted holes 1½ in. long to make adjustment for a long or short slit in end of miter cut.

Sample shows cut being made from inside to a stop, short of outside of stock, so a clamp nail can be driven in from inside for a possible molded edge on outside of frame. Many variations of the guide device could be made as needed. A hole in the corner on the face side is a chip pocket so all pieces will be cut alike.

The guide is held in place with ¼-in. carriage bolts and wing nuts with a wood clamp-

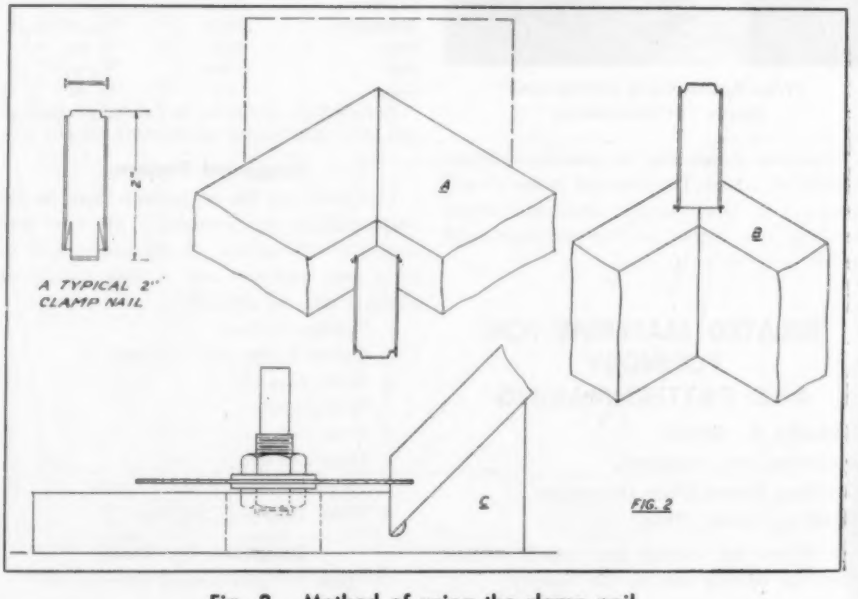

Fig. 2. Method of using the clamp nail

ing bar as a spacer under the drilling table. A hole is cut in the center of the guide large enough to take arbor collar and nuts so cuts as close as ¼-in. from the table can be made.

To make the saw, choose an old saw blade with uniform thickness and mark for center and outside sizes. Center hole must be punched, then filed to fit arbor. Drilling a saw blade is next to impossible. Using a large mill file, score deep near outside mark and break off the bulk of material. File to outside mark and then mount on arbor and finish to size, grinding as it turns in the drill press. Using a steel tape mark the disk at ¼-in. intervals and file the teeth to shape. Set slightly. The saw kerf should be as wide as the thickness of the web of the clamp nail.

The saw could be slightly smaller in size but should not be larger because the clamp nail could not be driven close enough to the outside of the frame, from the inside, to make a tight joint.

Grind the disk so it is of such a size that when you stretch a steel tape around it you can score it at ¼-in. intervals. This makes it easy to mark off in an *even* number of spaces.

Few sizes are given, the entire idea being suggestive.

You will find that clamp nails will drive a lot easier if you will use a little beeswax on the leading end.

At *A* in Figure 2 is shown a clamp nail being driven in from inside of frame against a backing block made of good substantial wood, cut at 90 deg. to fit outside corner of frame. This backing block will assist in keeping the two pieces in line while being fastened together.

At *B* in Figure 2 is shown the clamp nail being driven in from the edge after the slitting saw has made the necessary cuts on the jig suggested at *C*. Jig *C* should be fastened to the drilling table in the same manner as the guide described in Figure 1.

An aluminum boxcar door recently displayed by Alcoa weighs only 226 pounds, as compared to 500 pounds for a similar conventional metal door. — *Aluminum Company of America.*

* * *

The first forest railroad was established in 1852 for logging white pine in Steuben County, New York. — *Natl. Lumber Mfg. Assn.*

Teaching Materials For Industrial Education

CHRIS H. GRONEMAN
Head, Industrial Education Department
School of Engineering
The Agricultural and Mechanical College of Texas
College Station, Tex.

(Continued from page 33A of the April, 1952, issue)

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United States Office of Education
Superintendent of Documents
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Washington 25, D. C.
Adult Education:
Adult Education Activities of Public Schools, Report of Survey, 15¢
Cat. No. FS 5.17:107

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Washington 25, D. C.
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Suggestions for Selecting Clamps for the School Shop
Clamps, Catalog No. 17
Suggestions for Selecting Clamps for the Welding Shop

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Pittsburgh 19, Pa.
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Teacher's Manual
Outline of Aluminum
Alcoa Aluminum and Its Alloys
Alcoa Structural Handbook
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Finishes for Alcoa Aluminum
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Manitowoc, Wis.
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American Institute of Steel Construction, Inc.
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New York 17, N. Y.
Requirements for Building to Resist Earthquakes, No. 121
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Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings, No. 131
Prize Bridges — 1928–1948, No. 157
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350 Fifth Avenue
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33 West 39th Street
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Standard Welding Symbols, A2.0-47, $1
Standard Methods for Mechanical Testing of Welds (with 1945 Supplement) A4.0-42, 50¢
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5700–5800 West Bloomingdale Avenue
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General Catalog C–50
The Marvel Story, Bulletin ED–3

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ABC's of Wrought Iron
Byers General Catalog
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Texas City Carbide News
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Coated Abrasives
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Peerless Machine Company
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Peerless Products, Bulletin FL–58A

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Federal Educational Activities and Educational Issues Before Congress, Cat. No. Y4.Ed 8/1:Ed 8/5/v.1, 35¢
Movie Projectors in Public High Schools, Cat. No. FS 5.17:109, 15¢

United States Office of Education
Superintendent of Documents
Government Printing Office
Washington 25, D. C.
Colleges and Universities:
College Student Mortality, 15¢, Cat. No. I 16.3:937/11
Toward Better College Training, 25¢, Cat. No. FS 5.3:950/13
Consumer Education, 10¢, Cat. No. FS 5.17:94
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Curriculum Guide to Fire Safety, 10¢, Cat. No. FS 5.3:946/8
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Educational Exchanges:
Educational Exchanges Under Fullbright Act, 5¢, Cat. No. S 1.67:9
Elementary Education:
Elementary Education, 10¢, Cat. No. I 16.3:937/2
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Curriculum Adjustments for Gifted Children, 25¢, Cat. No. FS 5.3:946/1
Curriculum Adjustments for the Mentally Retarded, 35¢, Cat. No. FS 5.3:950/2
Education of Crippled Children in United States, 10¢, Cat. No. FS 5.18:80
Teachers' Problems with Exceptional Children:
Gifted Children, 10¢, Cat. No. FS 5.17:41
Mentally Retarded Children, 15¢, Cat. No. I 16.43:49
Extended School Services: Open Doors to Children, Extended School Services, 15¢, Cat. No. FS 5.2:Sch 65/9
Extraclass Activities for all Pupils, 20¢, Cat. No. FS 5.3:950/4
One-Teacher School, Its Midcentury Status, 20¢, Cat. No. FS 5.4:318
Parent Education:
Working with Parents, Handbook, 20¢, Cat. No. FS 5.3:948/7
Preparing Your Child for School, 15¢, Cat. No. FS 5.17:108
Public Affairs Pamphlets, 10¢, Cat. No. I 16:3 967/3
School-and-Work Programs, 20¢, Cat. No. FS 5.3:947/9
School Buildings and Equipment:
Lighting Schoolrooms, 10¢, No. FS 5.17:104
School Plant, Trends, Present Situation, and Needs, 15¢, Cat. No. FS 5.23:938–40
School Buses:
School Bus Drivers, Current Practices in Selection and Training, 10¢, Cat. No. FS 5.17:100
Secondary Education:
Broadening Services of Small High Schools, 20¢, Cat. No. FS 5.3:948/9
Directory of Secondary Schools in United States, $1.50, Cat. No. FS 5.4:250
Articulation of High School and College, 10¢, Monograph No. 10, Cat. No. I 16.3:932/17M
Requirements for High-School Graduation, 5¢, Cat. No. I 16.3:928/21
State Departments of Education
Structure of State Departments of Education, 40¢, Cat. No. FS 5.30:10
Statistics:
Statistics of City School Systems, 1945–46, 20¢, Cat. No. FS 523:944–46/chap. 3
Statistics of Higher Education, 1945–46, 25¢, Cat. No. FS 5.23:944–46
Teachers:
Attracting New Teachers, How Some Communities Are Doing It, 5¢, Cat. No. FS 5.7/a:T22/7
Teachers Abroad, 20¢, Cat. No. FS 5.3:950/10
Teaching as a Career, 15¢, Cat. No. FS 5.3:947/11
What Are Good Teachers Like?, 10¢, Cat. No. FS 5.7a:T22/5
Tests and Measurements:
Games and Self-Testing Activities for Classroom, 10¢, Cat. No. FS 5.2:G 14
Testing Practices of High-School Teachers, 10¢, Cat. No. I 16.3:939/9
Textbooks:
State Provisions for Free Textbooks and Instructional Materials, 10¢, Cat. No. FS 5.3:944/1
Typewriters and Typing:
Know your Typewriter, 15¢, Cat. No. FS 1.10:1
Typewriter Care, What to Do, How to Do It, 15¢, Cat. No. CS 1.42:1
Visiting Teacher:
Place of Visiting Teacher Services in the School Program, 15¢, Cat. No. FS 5.3:945/6
Vocational Education:
Administration of Vocational Education, 30¢, Cat. No. FS 5.123:1
Guide to Occupational Choice and Training, 35¢, Cat. No. FS 5.123:236
State and Preservice Preparation of Teachers of Vocational Education, 20¢, Cat. No. FS 5.123:219
Vocational Education Act of 1946, 5¢, Cat. No. S 7.5/1.79/586
Youth:
Delinquent Youth, 25¢, Cat. No. FS 5.3:945/5
Life Adjustment Education for Every Youth, 55¢, Cat. No. FS 5.2:L 62
Your Community and Its Young People, 10¢, Cat. No. FS 3.209:316
Zeal for American Democracy, 20¢ Cat. No. FS 5.7:30/5

TRANSPORTATION

Aeroproducts Division
General Motors Corporation
Municipal Airport
Dayton 1, Ohio
Descriptive Materials About Propellors

Aircooled Motors, Inc.
Syracuse 8, N. Y.
Franklin Model 4AC-176-B2 65 H.P. Aircraft Engine
Franklin Model 4AC-176-BA2 H.P. Aircraft Engine
Franklin "335" Aircraft Engine for Your Personal Plane

Aircraft Industries Association of America
Shoreham Building
Washington 5, D. C.
Planes Bulletin

Air World Education
80 East 42nd Street
New York 17, N. Y.
Aviation in the Elementary Grades
Time and Place: Aviation for Secondary Schools

Association of American Railroads
School and College Service
Transportation Building
Washington 6, D. C.
Quiz on Railroad and Railroading
Map List
Railway Literature
Train and Engine Books for Children
List of Principal Railroads in the United States with Home Address of Each
We Learn About Trains
Quiz, Jr.
A Chronology of American Railroads — Including Mileage by States and by Years
Names and Nicknames of Freight Trains
The Day of Two Noons

College Courses in Railroad Subjects
Named Passenger Trains
American Railroads, Their Growth and Development
The Human Side of Railroading
The Railroad Story
Railroad Film Directory

Association of Casualty and Surety Companies
Accident Prevention Department
60 John Street
New York 38, N. Y.
Safety Education in Elementary Schools, No. EG-1, 60¢
Hazards in Our Home Sweet Home, No. EG-5, 4¢
Primary Safety Picture Lessons, No. EG-11, 2¢
Every Agent Has a Stake in Cycle Safety, EG-12
Jethro Smi-Master Mind, No. EG-15
Are You As Safe As Your Car?, No. EG-17, 3¢
Tips for Cyclists, No. EG-19, 2¢
Drive Safely, Save Lives, Property and Dollars, No. EG-20, 2¢
Will You be Victim X?, No. EG-22, 2¢
Do and Don't Booklet, No. EG-24, 2¢
A Daily Reminder, No. EG-25, 1¢
Truck and Bus Drivers Rule Booklet, No. CV-1, 6¢
Commercial Vehicle Drivers Guide Book, No. CV-3, 6¢
Safety Supervision in Motor Vehicle Fleets, No. CV-4, 3¢
Man and the Motor Car, No. ED-1, $1.45
Administrator's Manual, No. ED-2, 15¢
Teacher's Manual, No. ED-2, 15¢
Driver Testing Devices — Their Construction and Use, No. ED-4, 30¢
Improving Driver Responsibility, No. ED-5
An Amateur Teaches Driver Education, No. ED-7
Driver Education, No. ED-13
For Safer, Saner Driving, No. ED-17
Getting Results Through Traffic Engineering-Booklet #1, No. T-1, 50¢
Getting Results Through Traffic Engineering-Booklet #2, No. T-2, 50¢
Getting Results Through Traffic Engineering-Booklet #3, No. T-11, 50¢
Getting Results Through Traffic Engineering-Single Sheet, Mailed Periodically upon request
Traffic Engineering and the Police, No. T-3, $2
Manual of Traffic Engineering Studies, No. T-5, $2.25
Proceedings, Second New England Traffic Engineering Conference, No. T-9
Proceedings, Third New England Traffic Engineering Conference, No. T-10
Williamsport, Pennsylvania Traffic Survey Report, No. T-16, 50¢
Parkersburg, West Virginia Traffic Survey Report, No. T-14, 50¢
Joplin, Missouri Traffic Survey Report, No. T-18, 50¢
Peoria, Illinois, Traffic Survey Report, No. T-19, 60¢
Elgin, Illinois, Traffic Survey Report, No. T-20, 50¢
Traffic Engineering Handbook, No. T-21, $6
Amsterdam, New York, Report on Traffic Administration
Herkimer, New York, Report on Traffic Administration
How to Make a Two Man Business District Parking Survey

Atchison, Topeka & Santa Fe Railway Exchange
Public Relations Department
Chicago 4, Ill.
Conquest — The Story of the Santa Fe and the Men Who Built It
Wagons Southwest — Story of Old Trail to Santa Fe
Quiz on Railroads and Railroading
The Railroad Story
A Teacher's Guide

Automobile Manufacturers Association
New Center Building
Detroit 2, Mich.
Standards for Automotive Service Instruction in Schools

Bendix Products Division
Bendix Aviation Corporation
South Bend 20, Ind.
Basic Principles of Carburetion as Applied to Stromberg Design, No. 10–52

Bicycle Institute of America, Inc.
122 East 42nd Street
New York 17, N. Y.
Ride With Care and Take Good Care of Your Bicycle
Bike Fun for Young Campers
Hints on Safety
Bike Regulation in the Community
Bicycle Safety Tests
Bike Rodeo

Black & Decker Mfg. Company, The
Towson 4, Md.
Use and Care Handbook for Valve Reconditioning Equipment
Principles of Valve Reconditioning

Blackhawk Mfg. Company
P.O. Box 613
Milwaukee, Wis.
Blackhawk Hydraulic Porto-Power Equipment
Hydraulic Jacks
Wrenches, Sockets, Open-Ends, Box-Types, Service Tools

Braniff International Airways
Love Field
Dallas 19, Tex.
Portraits of Progress

Buick Motor Division
Flint 2, Mich.
When Better Automobiles Are Built
Dial Your Own Driving Climate
How to Enjoy All the Fun and Freedom of Dynaflow Driving
Why the Buick Ride is Softer — Steadier — Safer
Basic Facts About Dynaflow Drive
Buick — Smart Buy for 1951

Canadian Pacific Railway Company at Windsor Station
Department of Public Relations
Montreal 3, Quebec
By Train Through the Canadian Rockies — The Canadian Pacific Way
Western Canada and the Canadian Rockies — By Canadian Pacific
Eastern Canada — By Canadian Pacific
Cruise by Canadian Pacific to Alaska and the Yukon
Canadian Pacific Map Railway Lines in Canada
Banff and Lake Louise in the Canadian Rockies

Capital Airlines
National Airport
Washington, D. C.
Capital Flight Kit

Champion Spark Plug Company
Toledo 1, Ohio
Champion Aircraft Spark Plug Service Manual

Chicago Rivet Machine Company
9600 West Jackson Blvd.
Bellwood, Ill.
Rivets
Heavy Duty 4-Station Brake Reliner

Civil Aeronautics Authority
Department of Commerce
Aviation Education Division, W-150
Washington 25, D. C.
Aeronautical Periodicals
Requirements for Stewardess and Purser Positions with the Airlines
Catalogue of Films Distributed by the Civil Aeronautics Administration
List of Publications
Sources of Information on Model Airplanes, Gliders and Kites
Approved Airman Agency Flying and Ground Schools
Certificated Mechanic Schools
A Survey of Collegiate Courses in Aviation and Related Fields
Colleges Offering Programs of Study in Aeronautical Engineering, Aeronautical Administration, and Aviation Service
Colleges and Universities Offering Courses in Jet and Rocket Propulsion
Aviation Education
Orientation in Air Age Education for Teachers
Aviation Education and the Civil Aeronautics Administration
State Plans, Programs, and Publications in Aviation Education

Colorado Department of Education
Denver, Colo.
Highways to Health and Safety: A Curriculum Guide for Health and Safety in the High Schools of Colorado, $1

Connecticut State Department of Education
Hartford, Conn.
Driver Education

Delaware State Department of Public Instruction
Division of Health
Physical Education and Driver Education
State of Delaware
Dover, Del.
Safer Motoring: A Guide for Young Drivers
Driver Education: A Guide for the Secondary Schools of Delaware

Delta Air Lines, Inc.
Municipal Airport
Atlanta, Ga.
Would You Like a Job That Offers Travel, Good Pay, Interesting Contacts?
Route Maps and Schedules

Eclipse — Pioneer
Division of Bendix Aviation Corporation
Teterboro, N. J.
Technical Manuals Covering the Various Products They Manufacture

Elwell-Parker Electric Company, The
Cleveland 3, Ohio
Industrial Logistics

Employers Mutuals of Wausau
Safety Engineering Department
Wausau, Wis.
You Can't Laugh it Off
The Case of the Silent Killer
Challenge to Maturity
Cycling Safety Rules
Vacation Days

Factory Insurance Association
555 Asylum Street
Hartford, Conn.
Fire Protection in the Airplane Industry

Fischer Body Division
General Motors Corporation
Detroit, Mich.
An Outline History of Transportation

General Motors
Educational Service
Department of Public Relations
Detroit 2, Mich.
Chemistry and Wheels
A Research Man Speaks
Short Stories of Science and Invention
Metallurgy and Wheels
Research Looks to New Horizons
A Power Primer
Power Goes to Work
Diesel, The Modern Power
When the Wheels Revolve
Story of General Motors
A Look at General Motors
American Battle for Abundance
The Automobile Story
Transportation Progress
Profits, Profits and Products
Five Years of Industrial Peace
Opportunities in the Automotive Business
Automotive Jobs in Yourtown, USA
The College Graduate and General Motors
Man to Man on the Job
If I Were 21
We Drivers
Driver Education Film Kit
Driver Training Kit for Teachers
ABC's of Hand Tools
Service Manuals, Charts, Assemblies

Illinois Central Railroad
Chicago 5, Ill.
The Railroad Story
My Finest Train Trip
Come Back Again!
Muscles for the Iron Horse
The Building of Mid-America
Trails and Rails

International Harvester Company
180 North Michigan Avenue
Chicago 1, Ill.
The Why and Wherefore of the Diesel Engine, No. A-386-NN
International Diesel Engines — Origin and Development, No. A-274-KK
100 Years in Agriculture and Industry, A-520-KK
Historical Facts About Early Harvester Vehicles, No. A-548-KK
Film Catalog, No. A-8-LL

Jack and Heintz Precision Industries, Inc.
1700 Broadway
Cleveland 1, Ohio
Aircraft Engine Starter

Lee Company, K. O.
Aberdeen, S. Dak.
Valve Seat Insert Ring Data Book
Mobile Valve Shop
Connecting Rod Aligners
Utility Valve Seat Grinders
Wet Valve Refacer
Read Carefully Instructions for Setting Up, Operating, Maintaining Your Valve Refacer

Lee Tire and Rubber Company of New York, Inc.
Conshohocken, Pa.
LEE of Conshohocken at the Franklin Institute

Maqua Company, The
Schenectady, N. Y.
Adventures in Jet Power
Adventures in Electricity, Electricity in Railroading
More Power in American Special

National Aeronautic Association
1025 Connecticut Avenue, N.W.
Washington, D. C.
Official Model Airplane Rules and Regulations

National Safety Council
425 North Michigan Avenue
Chicago, Ill.
Accident Facts, 1951
Jack Up Safety

Nebraska Department of Public Instruction
State Capitol
Lincoln, Neb.
Driver Education and Traffic Safety in Nebraska High Schools

New York Central System
Public Relations Department
466 Lexington Avenue
New York 17, N. Y.
The Romance of the Railroads
Operation Selkirk
The Princely New York Central
Grand Central Terminal
The Valley of the Hudson
Railroads at Work
American Railroads — Their Growth and Development

New York University
Center for Safety Education
1 Washington Square North
New York 3, N. Y.
25 Years of Research in Safety Education

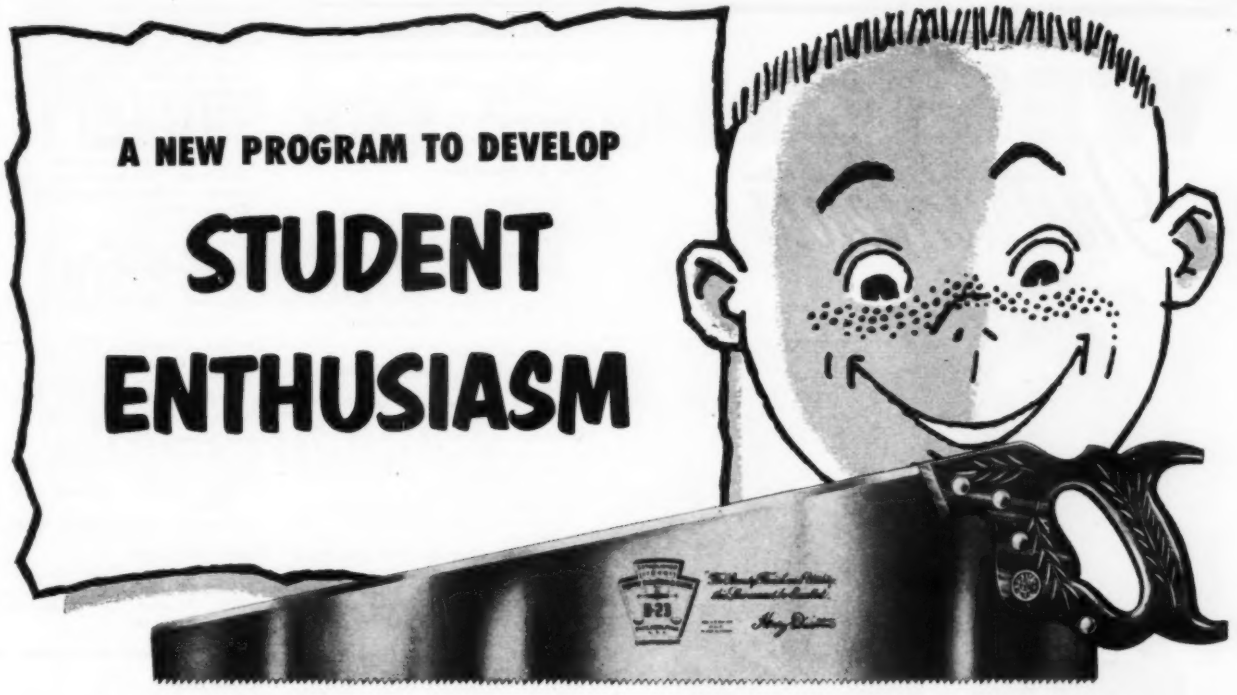
Norfolk and Western Railway
Advertising Department
501 General Office Building
Roanoke, Va.
Our Railroad!
The Story of Fuel Satisfaction

Northrop Aircraft, Inc.
Northrop Field
Hawthorne, Calif.
Facts About the Flying Wing

Northwest Airlines
1885 University Avenue
St. Paul 1, Minn.
Northwest Airlines Souvenir Flight Kit

Pan American World Airways
28–19 Bridge Plaza North
Long Island City 1, N. Y.

(Continued on page 24A)



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(Continued from page 176)

Pan American World Airways Teacher, periodical

Pennsylvania Grade, The
Crude Oil Association
Box 96
Oil City, Pa.
- Petroleum — Discovery and Production
- How Pennsylvania Motor Oils Are Made
- Ahead with Oil
- Facts and Figures
- An Exhibition or Lubrication?

Pennsylvania Railroad, The
1587 Broad Street Station Building
Philadelphia 4, Pa.
- American Railroads — Their Growth and Development
- Railroads at Work
- Meals on Wheels
- Vital Fractions of a Penny Mean Better Railroads
- Hundreds of New Cars and Locomotives for Both Travelers and Shippers
- New Locomotives for War and Peace
- New P.R.R. Sleeping Cars Provide More Rooms than Biggest Hotel
- Better Meals and Service for You on P.R.R. Dining Cars
- A "Thank You" Note
- Railroads at War — Planned Far Ahead to Do Their Part
- Electric Operations Opens Between Great American Cities
- Quiz on Railroads and Railroading
- The Railroad Story

Pioneer Air Lines
Municipal Airport
Houston 17, Tex.
- A Brief History of Pioneer Air Lines

Piper Aircraft Corporation
Lock Haven, Pa.
- Piper Sets the Pace Again with New Flying Ease
- A New King of Plane for a New King of Flying
- Here's How You Can Learn to Fly While You Travel
- What Your Town Needs for The Coming Air Age

Pratt and Whitney Aircraft
Division of United Aircraft Corporation
East Hartford 8, Conn.
- The Use of Operating Curves, 85¢
- Water Injection for Commercial Aircraft, 85¢
- The Application of the Torquemeter to Aircraft, 85¢
- Technical Publications and Charts Available

Pullman Company, The
Merchandise Mart Plaza
Chicago 54, Ill.
- Pullman on Dress Parade
- Look What's Attached to Your Pullman Ticket
- Here's What You Get When You go Pullman

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230 Park Avenue
New York, N. Y.
- Cavalcade of Express
- Express Service

Southern Pacific Company
65 Market Street
San Francisco 5, Calif.
- Seventy-Five Years of Progress

Starrett Company, The, L. S.
Athol, Mass.
- Starrett Automotive, Aviation, Marine and Farm Service Tool Catalog "A"

Stinson Division
Piper Aircraft Corporation
Lock Haven, Pa.
- Business Men Who Fly

Texas Company, The
135 East 42nd Street
New York 17, N. Y.
- Your Visit to Eagle Point Works
- Souvenir, Port Arthur Works
- Contribution of Petroleum to Industry, Farm and Home
- Petroleum Products
- Petroleum Marketing
- Petroleum Transportation
- Petroleum, Discovery and Production
- Outline of Petroleum and its Products
- Texaco Topics
- The Texaco Star
- The Texaco Dealer

Texas Education Agency
Austin, Tex.
- Winning More Friends for Driver Education

Travelers Insurance Company, The
Hartford, Conn.
- "R. I. P." — 1951 Book of Street and Highway Accident Data

Union Pacific Railroad
News Bureau
1416 Dodge Street
Omaha 2, Neb.
- Union Pacific Railroad — A Brief History
- Along the Union Pacific Railroad

United Air Lines
United Air Lines Building
Chicago 38, Ill.
- Free Aviation Education Materials and Services

United States Coast and Geodetic Survey
Director
Washington 25, D. C.
- Civil Airways and Mileage Chart

United States Naval Office of Public Relations
Pentagon Building
Washington, D. C.
- Pictorial History of Naval Aviation (Loose Leaf for Bulletin Board)
- Mimeographed "History of Naval Aviation"
- Safety in the Skies
- Study and How
- Studying for Your Navy Wings
- What is GCA
- Parachute Sense
- Taxi Sense
- Manners Sense
- Arctic Sense
- G Sense
- Oxygen Sense
- Flat-Hatting Sense
- Night Vision of Airmen
- Precipitation Static
- Life Aboard a Carrier

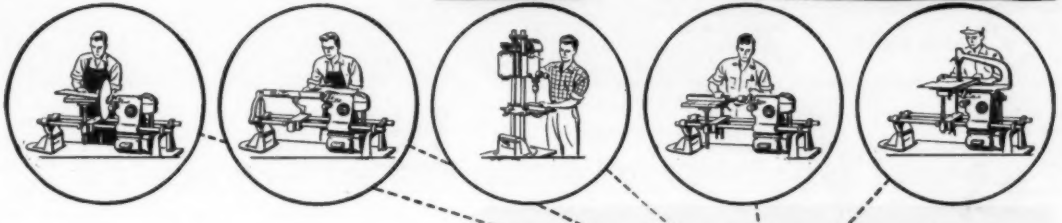
United States Office of Education
Superintendent of Documents
Government Printing Office
Washington 25, D. C.
- Aviation Education:
  - Aviation Bibliography and Course Outlines, for Use by Private and Public Vocational and Technical Schools, 20¢, Cat. No. C31.102: AV 5/14
  - Aviation in the Public Schools, 15¢, Cat. No. I 16.54/3:185
  - Pre-aviation-cadet Training in High Schools, 5¢, Cat. No. FS 5.18:62
  - Pre-Flight Aeronautics in Secondary Schools, 10¢, Cat. No. FS 5.18:63
- A Future for Aviation Education

United States Post Office Department
Assistant Postmaster General
Bureau of Transportation
Washington, D. C.
- Brief History of Air Postal Transport

United States Superintendent of Documents
Government Printing Office
Washington 25, D. C.
- Wage Structure Motor Vehicles and Parts, 1950, 20¢, No. L 2.3:1015
- National Airport Plan, 1951, No. C31.102:Ai7/16/951, $1.25

(Continued on page 26A)

Flexible work stations boost school shop efficiency



IT HAPPENS in the best of shops—work piles up on various single-purpose power tools. Students stand idle awaiting their turn. Machines not in demand are idle, too.

But in the Flexible Shop (a school shop equipped with several SHOPSMITHS) the pile-up problem all but disappears. The SHOPSMITHS provide *flexible work stations*. Each converts to an 8″ circular saw, 12″ disc sander, 33″ wood lathe, 15″ drill press, horizontal drill or jig saw. The instructor can vary his assortment of equipment to fit his need. Or he can set up all tools alike for group instruction.

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TEACHING MATERIALS

(Continued from page 24A)

Questions and Answers for Private Pilots, No. C 31.102:P 64/5, 15¢

United States Weather Bureau
Chief
24th and M Streets
Washington 25, D. C.
Cloud Forms, Free to Teachers
Educational Series, Free to Teachers

Willard Storage Battery Company
246–286 East 131st Street
Cleveland, Ohio
Battery Service Manual
Willard Stationary Battery Applications
Willard Battery Catalog
Willard Cables and Accessories
Willard Battery Service Equipment
Technical Data — Willard Batteries

WOODS

Adjustable Clamp Company
417 North Ashland Avenue
Chicago 22, Ill.
Suggestions for Selecting Clamps for the Industrial Shop
Suggestions for Selecting Clamps for the School Shop
Clamps, Catalog No. 17

American Walnut Manufacturers Association
666 North Lake Shore Drive
Chicago 11, Ill.
Growing Walnut for Profit
Forgotten Acres
The Story of American Walnut
Income From Cedar

Appalachian Hardwood Manufacturers, Inc.
414 Walnut Street
Cincinnati 2, Ohio
Appalachian Hardwoods, America's Finest

Atkins and Company, E. C.
402 South Illinois Street
Indianapolis 9, Ind.
Saw Sense
Crosscut Saw
Directions for Fitting Narrow Band and Small Circular Saws

Atlas Press Company
1915–2023 North Pitcher Street
Kalamazoo, Mich.
How to Use the Circular Saw
How to Use the No. 4020 Jig Saw
How to Use the Drill Press
Atlas Woodworking Tools
At Your Finger Tips

Belsaw Machinery Company
315 Westport Road
Kansas City 2, Mo.
Belsaw Machines Information

Black & Decker Mfg. Company, The
Towson 4, Md.
Standard Catalog
Use and Care Handbook for Portable Electric Drills
Use and Care Handbook for Portable Electric Sanders
Use and Care Handbook for Portable Electric Polishers
Use and Care Handbook for Portable Electric Saws

Boice-Crane Company
932 Central Avenue
Toledo 6, Ohio
Instruction Book, Charts and Catalog

Bordon Company, The
Chemical Division
350 Madison Avenue
New York 17, N. Y.
CASCO Gluing Guide
CASCO Projects
CASCAMITE Water Projects
CASCOPHEN Waterproof Resin Glue

Brodhead-Garrett Company
Cleveland 5, Ohio
Soft Texture Lumber Catalog

Brunner Mfg. Company
1823 Broad Street
Utica 1, N. Y.
Air Compressor Data

California Redwood Association
405 Montgomery Street
San Francisco 4, Calif.
In This Region
Redwood Region Tree Farms
California Redwood — Its Properties and Uses
Whatever the Job
Redwood Data Sheets

Carnegie-Illinois Steel Corporation
Industrial Relations Department
Pittsburgh, Pa.
Safety in the Woodshop
The Use and Care of Hand Tools, Instructor's Guide

Clover Mfg. Company
Norwalk, Conn.
Coated Abrasives

Columbian Vise & Mfg. Company, The
9021 Bessemer Avenue
Cleveland, Ohio
Catalog

Commonwealth of Pennsylvania
Department of Labor and Industry
Harrisburg, Pa.
Safe Practices Recommendations

Constantine & Sons, Inc., Albert
797 East 135th Street
New York 54, N. Y.
Constantine's Manual for Craftsmen
Chips and Chats

Crescent Tool Company
Jamestown, N. Y.
Hand Tool Booklet

Crown Zellerbach Corporation
343 Sansome Street
San Francisco 19, Calif.
Growing Paper on Tree Farms
Paper, Its Story

Delta Power Tool Division
Rockwell Mfg. Company
600 East Vienna Avenue
Milwaukee 1, Wis.
Things to Make on Your Band Saw, 25¢
Things to Make on Lour Lathe, 25¢
Things to Make on Your Circular Saw, 25¢
Things to Make on Your Scroll Saw, 25¢
The Toy Book, 25¢
Getting the Most Out of Your Lathe, 50¢
Getting the Most Out of Your Drill Press, 25¢
Getting the Most Out of Your Abrasive Tools, 25¢
Getting the Most Out of Your Band and Scroll Saw, 25¢
Getting the Most Out of Your Circular Saw and Jointer, 50¢
Getting the Most Out of Your Shaper, 25¢
How to Plan Your Home Workshop, 25¢
Getting the Most out of the Farm Shop, 25¢
Practical Finishing Methods, 50¢
Home Workshop Floor Plans, $1
19 Charming Chairs, 15¢
Furniture Designs, 25¢
Garden Furniture, 10¢
21 Lovely Lamps, 10¢
Novelties, 25¢
One-Evening Projects, 10¢
Small Furniture Designs, 20¢
40 Fine Tables, 25¢
Toys, Games, and Playground Equipment, 10¢
Foot Powered Loom, 50¢
24-Room Swallow House, 25¢
Costume Jewelry, 25¢
11-Foot Utility Boat, $1
Gun Rack and Cabinet, 10¢
Child's Swing and Rocker, 25¢
Garden Furniture, 50¢
Vanity Dresser, 25¢
Duck Decoys, 25¢
Plywood Sailboat "Pelican," $2
Junior Pocket Billiard Table, $2
Turned Colonial Table, 25¢

(Continued on page 28A)

The Sensationally NEW Low-Priced

PARKS No. 20
20" PLANER

Here is a modernly designed, rugged, high-speed, low-priced planer that is ideally suited for every shop and industrial plant requiring a quality surfacer. The Parks No. 20 Planer has a four-knife cutterhead with a speed of 3600 R.P.M. and offers two feed speeds — 20 and 40 F.P.M., and 40 and 80 F.P.M. Write for complete descriptive literature.

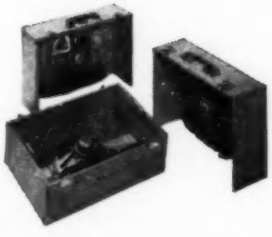
The PARKS Heavy-Duty 12" x 4" Planer

A compact, sturdy, thickness planer that offers mill planer precision and ruggedness at a sensationally low price. Write for descriptive catalog sheet.

The PARKS WOODWORKING MACHINE CO., Dept. 22-A15 1546 Knowlton St., Cincinnati 23, O.

The world at their finger tips

It's easy with the Kodascope Pageant Sound Projector



For assembly-hall showings...
The new Kodak Multi-Speaker Unit gives you three extra speakers. Placing these at selected locations provides effective sound distribution in any hall or auditorium, regardless of acoustical conditions. When packed, the speakers form a light, compact case that contains space for a 2000-ft. reel. List price, $92.50.

To grasp world events is difficult enough even for grownups. For most students, it is impossible . . . unless you can put movies to work. They make events live, create immediate understanding. Result: students learn more, retain more for a longer period of time. A limited school-film library is no handicap, either, because thousands of films on a wide variety of subjects are available today from many sources.

It's so easy and economical to add movies to your teaching facilities that every school should have at least one 16mm. Kodascope Pageant Sound Projector. It lists at only $400 with speaker and gives you sharper, clearer pictures with more natural sound. Built to last, all moving parts are extra sturdy and lubricated for life.

Students soon learn to become projectionists. In fact, many schools depend on them entirely to set up and operate the Kodascope Pageant Sound Projector. This leaves the teacher free to concentrate on the message. Let a Kodak Audio-Visual dealer show you how easy the Pageant works . . . or write for new booklet.

Prices are subject to change without notice.

MOTION PICTURES
. . . teach, train, entertain

EASTMAN KODAK COMPANY (Dept. 2), Rochester 4, N. Y. 193

Please send me: ☐ complete information on the new Kodak Multi-Speaker Unit; ☐ your booklet, "The Kodascope Pageant Sound Projector."

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STATE_____

Kodak

TEACHING MATERIALS

(Continued from page 26A)

Book Trough, 25¢
Wall Shelf, 50¢
Doll House, $1
Silhouettes, 25¢
Plant Table, 50¢
Cobbler's Lamp Table, 25¢
Magazine Stand, 50¢
Lawn Swing, 50¢
Bird Feeder, 25¢
Duck Skiff "Teal," $1
Delta Power Tool Journal
Deltagram and Deltacraft Circular

Diston and Sons, Inc., Henry
Tacony
Philadelphia 35, Pa.
Diston Saw, Tool, and File Manual
Fight Waste

Dixon, Inc., William
32–42 East Kinney Street
Newark 1, N. J.
The Dixon Manual for Artisans in Wood and Metal, $1.50

DonJer Products Company
51–47 69th Street
Woodside, Long Island, N. Y.
New Finishes and Craft Projects Catalog

Donley Brothers Company, The
13900 Miles Avenue
Cleveland 5, Ohio
Donley Devices

Douglas Fir Plywood Corporation
301 Tacoma Building, Tacoma 2, Wash.
848 Daily News Building, Chicago 6, Ill.
1232 Shorham Building, Washington 5, D. C.
The 500 Fifth Avenue Building, New York 18, N. Y.
The Square and Its Uses
Modern Miracle in Wood
Catalog of Plywood Boat Plans
Boat Plans
Farm Building Plans

Foley Mfg. Company
3300 N. E. Fifth Street
Minneapolis 18, Minn.
Catalogs on Saw Setting Equipment

Forest Industries Information Committee of Minnesota
516 Lyceum Building
Duluth 2, Minn.
Minnesota's Forest Wealth
Forestry Bulletin No. 1, Cutting Small Trees Does Not Pay
Forestry Bulletin No. 2, Jobs Are Burning Up
Forestry Bulletin No. 3, It Pays to Manage Jack Pines
Conservation of the Forest Wealth of Minnesota

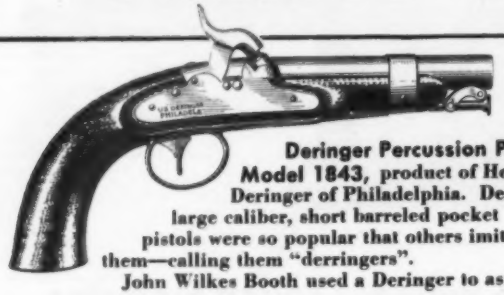
General Electric Company
1285 Boston Avenue
Bridgeport 2, Conn.
Clock Catalog

General Finishes Sales and Service Company
1548 Bruce Street, W
Milwaukee 4, Wis.
Facts on Preserving and Finishing of Beautiful Wood
Instructions and Techniques for the Sealacell Penetrating Process

Grinding Wheel Institute
P.O. Box 64
Greendale, Mass.
Mounting Technique for Wheel Sleeves on Cylindrical Grinding Machines
Center Type Cylindrical Grinding, Booklet No. 9

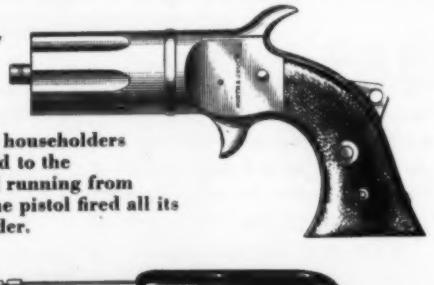
(Continued on page 31A)

Famous Guns



Deringer Percussion Pistol, Model 1843, product of Henry Deringer of Philadelphia. Deringer's large caliber, short barreled pocket pistols were so popular that others imitated them—calling them "derringers".
John Wilkes Booth used a Deringer to assassinate Lincoln.

Trap or Doorjamb Pistol, Caliber .31, made by North & Couch, Middletown, Conn. This lethal little device protected householders against burglars. Fixed to the doorjamb, with a cord running from muzzle rod to door, the pistol fired all its barrels into any intruder.



Weller Instant Heating Soldering Gun
Weller Guns simplify soldering instruction, save time and current. Switch instantly to high or low heat as job requires. Pre-focused spotlights end "blind soldering." Exclusive tip-fastening arrangement assures full, constant heat. Perfect balance aids handling skill. Dual heat adds greatly to life of low-cost replaceable tips. High-impact plastic housing. Weller Guns pay for themselves in a few months. See at your Distributor or write for Bulletin direct.

Weller

Get SOLDERING TIPS, new Weller Handy Guide to faster, easier soldering. 20 pages, fully illustrated. Price 10c at your Distributor, or order direct. Special discount for classroom quantities.

BETTER FROM GRIP TO TIP!

SOLDERING GUNS 811 Packer Street, Easton, Pa.

The Finest Soldering Tool for the Finest Craftsmen

PERSONAL NEWS

(Continued from page 8A)

♦ JACK C. HEDGE, experimental test mechanic for the Electro-Motive Division, General Motors, in La Grange, has been appointed assistant engineer in the heat-power department at Armour Research Foundation of Illinois Institute of Technology.

♦ JAMES E. ASH, mechanics instructor at Illinois Institute of Technology, has been named associate research engineer in the heat-power department of Armour Research Foundation of Illinois Tech.

♦ HOWARD E. ZIEFLE, supervisor of vocational-industrial education in Baltimore, Md., since 1943, has been appointed principal of the Edison Vocational High School to fill the vacancy caused by the resignation of Millard C. Kent.

Mr. Ziefle will also serve as co-ordinator of the programs of Edison, Barton, and Mergenthaler Vocational High Schools in the preparation for the opening of the new Mergenthaler Vocational-Technical High School, at which time he is to serve as principal of that school.

Mr. Ziefle had many years of experience in industry before becoming a teacher of electricity in the Edison Vocational High School. He has his M.A. degree, 1941, from the University of Maryland. From 1938 to 1943 he served as principal of the Wilson General Vocational School No. 294 before assuming his duties at the central office.

♦ SAM BUCKOFF is the new machine-shop teacher at Boone, Iowa.

The National Society for Crippled Children and Adults, Inc.
11 S. LaSalle St., Chicago 3, Ill.
The Easter Seal Agency

SCALES

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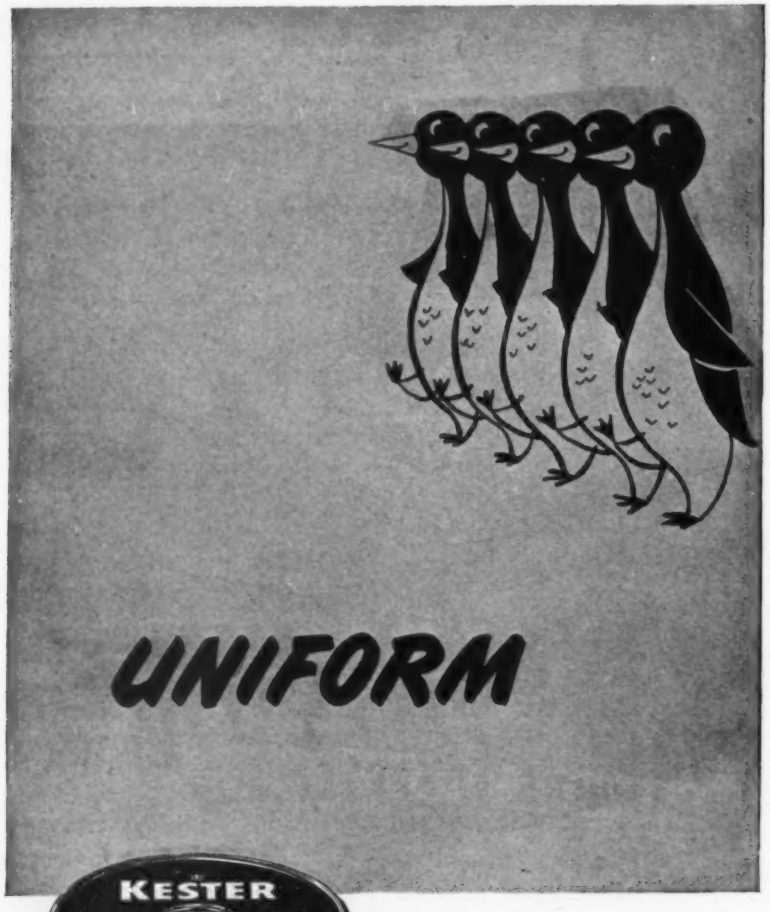
CHICAGO 18, ILLINOIS



KESTER FLUX-CORE SOLDER

UNIFORM **Results for You**
UNIFORM **Results for the Student**

You should use Kester Acid-Core and Rosin-Core Solders in your classroom instruction because these are the Solders the Student will be using when he graduates into commercial fields.

It will be to your credit to make sure he is familiar with the well known and widely used Kester Flux-Core Solders.

Two Free Manuals: **One for the instructor and a modified version for the student.**

KESTER SOLDER COMPANY
4257 Wrightwood Ave., Chicago 39
Newark 5, New Jersey • Brantford, Canada

KESTER SOLDER

News Notes

♦ Dwight W. Nichols, director of industrial arts, San Francisco State College, announced that Dr. Jesse Rathbun, co-ordinator of industrial arts, San Francisco schools, will teach a two-week School Shop Safety Workshop at the State College this summer. The date of this two-week workshop, providing two semester units of graduate or undergraduate credit, is June 23 through July 3, 1952. At the same time Mr. Nichols announced that Dr. Kenneth W. Brown, assistant director of fine and industrial arts in the Philadelphia, Pa., schools, would teach the following two workshops: Practicum in Industrial Arts Education, July 5 to 16, for two units; and a Workshop in Laboratory Planning, July 21 to August 1, for two units.

These are the first series of two-week workshops for industrial-arts teachers that have been offered at San Francisco State College. They have been established to meet the need of teachers who cannot attend the full six-week summer session, but who desire to work on and with professional problems. Teachers are encouraged to relate their school problems to these workshops. A fourth workshop, Supervision in Industrial Arts, is also planned. The dates and staff will be announced later. All workshops will meet at the New Campus, 19th Avenue and Holloway, San Francisco, from 9:00 to 12:00 a.m. daily. For further information call Mr. Nichols at JUniper 4–9581.

♦ School-age craftsmen in every section of the country will match their skills in competition for prizes valued at more than $45,000 in Ford Motor Company's 1952 Industrial Arts Awards program.

Nationwide in scope, the program is in its third year of Ford sponsorship. Judging of entries will take place in July at Dearborn, Mich.

A total of 1462 individual awards will be made this year in four groups, ten divisions, and 28 classifications. The Industrial Arts Awards program is open to pupils under 21 in grades seven through twelve of any school in the United States. Entries must be regular class projects made in school shops under the supervision of instructors.

Assisting Ford Motor Company in conducting Industrial Arts Awards is a national advisory committee of fifty leaders in the industrial arts and vocational education fields. George H. Fern, who has been active in the program since its inception, serves as consultant.

Dewey F. Barich supervises the program for the company.

For information write to *Ford Motor Co., Dearborn, Mich.*

♦ Rider TEK-FILE, the monthly packaged service data of John F. Rider Publisher, Inc., 480 Canal St., New York 13, N. Y., now lists 32 different TV TEK-FILE Packs. The February, 1952, releases, Packs 17 through 32, are now being shipped to the organization's distributors.

The publishing organization has in production 16 new Packs of television servicing data containing information on current receivers, including those in the 1952 lines, and data for receivers produced during the past few years. The new Packs contain complete manufacturers' data on 734 models not previously published in TEK-FILE form. This brings the total TV coverage to 1974 models in 48 Packs. Rider distributors received Packs 33 through 48 the latter part of February.

(Continued on page 31A)

TEACHING MATERIALS

(Continued from page 28A)

Pressure Blasting with Blastite Grain, Booklet No. 7
Disc Grinding
Metallic Cutting Off with Abrasive Wheels, Booklet No. 6
Abrasive Products for the Foundry, Booklet No. 4
MX Products, Booklet No. 3
Vonnegut Brush-Backed Sander Head, Booklet No. 1
Resin Industrial Cloth, Booklet No. 2
Handling Storage and Inspection of Grinding Wheels
Portable Grinding Machines
Sanding Finishing
High Speed Grinding Machines
Causes and Correction of Common Grinding Errors
The Romance of Carborundum
Abrasive Grain and Powders

Heller Brothers Company
Newcomerstown, Ohio
How to Choose and Use Files

Hitchcock Publishing Company
222 East Willow Avenue
Wheaton, Ill.
Woodworking Digest

Homasote Company
P.O. Box 441
Trenton, N. J.
What is It?
Here, There, and Everywhere — You Can Use
The Facts About Weatherproof Homasote
Specifications and Instructions — Weatherproof Homasote
The Nova-I.P.C. Weatherproofing Products for All Types of Masonry, Stucco, and Plaster

Howard and Smith, Inc.
14255 Schaefer
Detroit 27, Mich.
Shop Equipment Catalog

Insulation Board Institute
111 West Washington Street
Chicago 2, Ill.
Fundamentals of Building Insulation

International Paper Company
220 East 42nd Street
New York 17, N. Y.
The Great Southern Tree Crop

Junior-Pro Products Company
3206 Morganford Road
St. Louis 16, Mo.
Roll-eez Roller Bearings for Wooden Drawers Information

Koebel Diamond Tool Company
9456 Grinnell Avenue
Detroit 13, Mich.
For Grinder Men Only
Unsung Heroes of Industry
The Story of the Perfect Octahedron
How Much Work Should a Diamond Do?
But the Horse Died
Diamond Tools
The Fable of the Tough Beard and the Dull Razor
The Fable of the Grinding Wheel that was Fussy About Diamonds

LePage's, Inc.
Gloucester, Mass.
LePage's Glue and Other Adhesives
Glue Facts for Industrial Arts Instructors, Home Craftsmen

Macklin Company
Jackson, Mich.
Saw Gumming Wheels

(Continued on next page)

NEWS NOTES

(Continued from page 30A)

♦ The top prize of a $2,800 scholarship in the eleventh Westinghouse talent search went to 17-year-old Karl H. Muench of Evanston, Ill., for his work in endocrinology.

His studies had sought to find out whether the chemical caponizing of chickens, which increases weight and tenderizes meat, might later have adverse effects upon human beings, such as stunting children's growth, if the fowl were consumed over long periods of time. He pointed out that his work had made only a small contribution to solving a problem that remained unanswered.

♦ Government Aeronautical Services, Publications, and Visual Aids Available to Teachers. Circular No. 331. January, 1952. 10 pp., free. By Willis C. Brown, Specialist for Aviation Education, Office of Education, Federal Security Agency, Washington 25, D. C.

This is a listing of 16 sources of Services, 19 Publications sources, and 10 Visual Aids sources compiled from questionnaires sent to government agencies only. The listing represents the combined resources of government agencies made available to teachers in the field of aviation education. It shows whether there is a charge or the offering is free, and how and where it is available.

♦ New York State's first international program of related instruction for apprentices is being conducted at Trott Vocational High School in Niagara Falls, N. Y. Seven apprentices of the Canadian Cellucottin Company of Niagara Falls, Ont., Can., are attending classes every Saturday morning at Trott. Two electrical apprentices and five conversion mechanics (millwrights) are in the group. The Canadian Cellucottin Company pays the apprentices for their time in school and their nonresident tuition and book fees.

Seven new industrial co-operative programs have been started this year under the following teacher-co-ordinators: Charles Allgeier, Depew High School; Kenneth Darling, Valley Stream Central High School; Harvey Handel, Schenectady High Schools; Edwin King, Clarence Central School; George O'Mara, Thomas A. Edison Vocational High School, Jamaica; Clifford Peterson, Putnam County Schools; and Alfred Ploeser, Bay Shore High School.

♦ Twenty faculty members of the International Correspondence Schools recently enrolled for special courses in the Graduate School of Education of the University of Scranton. This graduate level course is a joint venture on the part of

(Continued on next page)

It's a 6" Disc Sander and Polisher
It's a Fine Finish Sander with the No. 980 Orbital Attachment
It's a Bench Unit with the No. 9668 Stand
It's a ¼" Drill with No. 9665 Jacobs Key Chuck
Only Millers Falls New No. 966 Sander-Polisher does . . .
$37.50
with 6" rubber pad, 6" lamb's wool bonnet, and 3 6" sanding discs.
A wide line of additional accessories and attachments makes this new No. 966 the most versatile finishing and multi-purpose tool ever developed.
1 Disc Sanding and Polishing
2 Orbital Fine Finishing
Plus all these other operations
3. Grinding
4. Drilling
5. Waxing
6. Wire Brushing
7. Cleaning
8. Mixing Paint
9. Polishing
MILLERS FALLS TOOLS
SINCE 1868
The Mark of Superiority
When you see and try this remarkable new Millers Falls No. 966 Sander-Polisher, you'll agree there's an important place for it in every school shop. It's powerful . . . ruggedly built . . . easy to use. And it's the only tool that does both disc and orbital finishing in addition to all its other uses.
Compare the range of jobs it does . . . compare its power and quality . . . compare its price. You'll find no other tool offers you so much for so little. Ask your supplier to let you try it or write for complete details.
Millers Falls Company • Greenfield, Mass.

TEACHING MATERIALS

(Continued from previous page)

Macklin Grinding Wheels — Protect Your Production
Disc Grinding — Safe Rules and Methods
A Macklin Grinding Wheel for Every Grinding Job
Macklin — Sharpening Stones and Grinding Wheels for Every Purpose
Helpful Hints
American Standard Safety Code for the Use, Care, and Protection of Abrasive Wheels
General Catalog
Mack-Flex Wheels

Mahogany Association, Inc.
75 East Wacker Drive
Chicago 1, Ill.
The Mahogany Book
Facts to Help You Sell Mahogany

Maple Flooring Manufacturers Association
46 Washington Blvd.
Oshkosh, Wis.
A Glimpse of An Interesting Modern Home
Grading Rules
Finishing Northern Hard Maple Flooring the MFMA Way

Masonite Corporation
111 West Washington Street
Chicago 2, Ill.
Masonite Hardboards
A Guide for Product Designers

Millers Falls Company
57 Wells Street
Greenville, Mass.
Tool Catalog

Morgan Vise Company
126 North Jefferson Street
Chicago 6, Ill.
Complete Vise Catalog

Mummert-Dixon Company
Hanover, Pa.
Oilston Tool Grinder Descriptive Bulletin

National Lumber Manufacturers Association
1319 Eighteenth Street, N.W.
Washington 6, D. C.
America's Forest Resources
Lumber Industry Facts

National Oak Flooring Manufacturer's Association
814 Sterick Building
Memphis 3, Tenn.
The Hardwood Flooring Handbook

National Safety Council
425 North Michigan Avenue
Chicago 11, Ill.
Poster Packet, $1.25
Safety in the Woodshop, No. 46
School Shop Accidents
School Shop Safety
Integrating Safety in Industrial Arts
Artificial Respiration
What to Do For a Wound — For Shock
What to Do For Poisoning
What to Do For Burns and Scalds
What to Do For Heat Cramps, Heat Exhaustion, Sunstroke, and Fainting
What to Do For a Broken Bone
What to Do For Sprains, and Strains, How to Move an Injured Person
What to Do For Bleeding
National Safety News, $5.50 for 12 Month Sub.
Safety Education in the School Shop, 69¢
School Shop Safety Newsletter, 85¢ Sub. 9 mo.
Shop Safety, 29¢

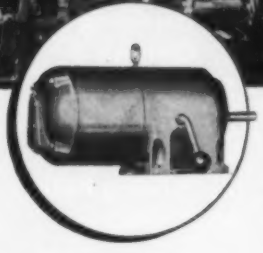
(Continued on page 35A)

ELIMINATE
HAZARDOUS
LINESHAFTING

Specifically designed to individually motorize machine tools originally driven by lineshaft, LIMA GEARSHIFT DRIVES were selected by Ohio State University to provide its students with the very best in modern machine shop equipment.

Ohio State is but one of many schools throughout the nation that have modernized their machine shops with LIMA DRIVES, providing the utmost in functional safety, adequate lighting, proper machine location and the complete elimination of hazardous lineshafting.

Ohio State's completely modernized Industrial Engineering Department



• *Selective Speed* LIMA GEARSHIFT DRIVES for application to all types of machine tools and production equipment are built in sizes from ½ to 25 HP.

Complete engineering facilities available.

LIMA GEARSHIFT DRIVES & MOTORS
WRITE FOR LITERATURE
Representation in principal cities
THE LIMA ELECTRIC MOTOR COMPANY 3451 FINDLAY ROAD, LIMA, OHIO

NEWS NOTES

(Continued from previous page)

the University of Scranton and the International Correspondence Schools to show the application of the general principles of education to correspondence education.

Members of the Graduate School of Education of the University, Dr. John Bourne and Dr. L. J. Lennon, are working closely with the I.C.S. in developing a sound course of instruction. Faculties of both institutions are contributing to the course content.

The class meets for two hours each Friday evening, either at the University or at the I.C.S., depending upon facilities required for each session.

♦ The new, comprehensive catalogue, "Gauge Blocks and Accessories for Modern Measurement Control," which has been published by the DoAll Company, presents descriptive matter and illustrations to explain the increasing importance of measuring with gauge blocks and light wave interference bands. Included are the following sections:

Basis of dimensional measurement: Why accuracy is dependent on the constancy of a light wave length.

Need for gauge blocks: Why present-day production is possible only because of gauge blocks.

Gauge block quality: The requisites of a good gauge block.

Typical uses of gauge blocks: Illustrating the many ways of using gauge blocks.

DoAll gauge block sets: A specification listing of the many various sized sets of gauge blocks.

Gauge block accessories: Description of the gauge instruments and accessories that greatly increase the utility of gauge blocks and efficiency in handling gauge blocks.

Calibration service: How to maintain the accuracy of gauge blocks.

Technical assistance: Showing the many educational aids offered by the DoAll Company — films, books, clinics, demonstrations, etc.

Copies of this new catalogue are available by writing *The DoAll Co., Des Plaines, Ill.* Ask for Bulletin No. 51-201.

♦ The initiation of the new members of the Stout Arts and Crafts Club took place on February 25 at Menomonie, Wis.

Seven new members were initiated this semester They are: James Zeasman, Deforest Bergvall, Phillip Burkhalter, Robert McBride, Dufur Peters, Walter Westenberg, and Kenneth Pietenpol.

(Continued on page 34A)

Specify TOLCO for your SCHOOL SHOP

The T-14 represents the finest in school shop benches. The sturdy rock maple frame is mortised — tenoned and bolted for extra long life and rigidity. Work space for two students with ample project storage drawers. Beautiful natural finish.

TOLCO

Ten different TOLCO models and sizes are available for every school requirement from Kindergarten through the Vocational School.

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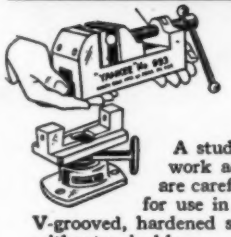
Electronic RCA Gluing

"YANKEE" VISES

good teaching tools

ACCURATE AND SAFE



A student learns faster with a vise that lines up work accurately. He's safer, too. "Yankee" Vises are carefully machined on base, sides and front end, for use in any position. Each vise is furnished with V-grooved, hardened steel block for rounds. Available with and without swivel base.

Versatile, too. Can be used for bench or machine work. Easily detachable from swivel base without disturbing work, for use on milling machine, drill press, surface grinder, etc. Adaptable as low-cost jigs or fixtures. Four jaw widths; 1½", 2", 2¾" and 4".

A postcard will bring you the "Yankee" Tool Book FREE! North Bros., 206 West Lehigh Ave., Phila. 33, Pa.

NORTH BROS. MFG. CO.

Philadelphia 33, Pa.

"YANKEE" TOOLS NOW PART OF STANLEY

THE TOOL BOX OF THE WORLD

it was done with

HIGGINS INK

J. G. (Micky) Strobel drew this charming illustration for *The Prospect Before Us*, by John Dos Passos, without using a static or mechanical line.

Original size 8⅞" x 13½"

By courtesy of the artist and Houghton Mifflin Co.

The Illustration

Note the sensitive, inventive handling of the books, the stuffed birds, the architectural details, the chandelier. Strobel's whimsical treatment at times suggests doodling. Yet his pen never fails to convey what he means.

The Medium

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WILLSON PRODUCTS, Inc., 216 Washington St., Reading, Pennsylvania

NEWS NOTES

(Continued from page 32A)

♦ The National Science Teachers Association, 1201 — 16th St., N.W., Washington 6, D. C., offers $5,000 in awards to seventh- to tenth-grade and eleventh- to twelfth-grade students and teachers of science and engineering in order to encourage greater interest in these fields, and to award those who have done outstanding work.

All entries for this program must be in the hands of the committee by May 30, 1952.

For further information write to the Committee on Awards at the address given above.

♦ The Porter-Cable Machine Company recently published a case study booklet on Abrasive-Belt Machines. We feel that these successful case studies add some imagination to basic facts and help prospects and customers visualize the broad potentialities of abrasive-belt machining. The book is also a basic manual on the subject because it describes in general terms the relative advantages of abrasive-belt machining.

Write to the *Porter-Cable Machine Co., Syracuse 8, N. Y.*, for your copy.

♦ Peerless Film Processing Corporation has developed a process by which motion picture negatives stored for use in vaults and considered unusable because of excess shrinkage, may be reconditioned to permit making commercially acceptable prints on continuous contact-printing equipment. The treatment is called "Peer-Renu" and a patent is pending.

For further information write to *Peerless Film Processing Corp., 130 West 46th St., New York 36, N. Y.*, and at its *West Coast Branch, 959 Seward St., Hollywood 38, Calif.*

♦ The common cold accounts for more classroom absences than any other common ailment, recent figures reveal. Colds are not only a nuisance to the student (and family) but also to the teacher.

A ten-minute technical animated film, "How To Catch A Cold," by Walt Disney Productions, is now available for group showings in schools and colleges; by clubs, civic groups, and others free of charge.

Sets of six full color 14 by 20-in. posters may be had at no charge for posting on bulletin boards.

To arrange for showings, write to: *Association Films, 35 West 45th St., New York City; 79 East Adams St., Chicago, Ill.; 1915 Live Oak St., Dallas, Tex.*; or *351 Turk St., San Francisco, Calif.*

♦ "Fishing With H-I Power Glass," a 22-minute B&W sound film, showing the step by step manufacturing process of producing solid and tubular glass fishing rods, has been released by the Horrocks-Ibbotson Company of Utica, N. Y.

The manufacturing processes shown include methods used in creating solid glass rods from glass thread, and the cutting of material from glass cloth to obtain tubular rods.

The film will be sent prepaid, free of charge, to any school upon request and bookings should be made at least two weeks in advance.

Requests for film should be addressed to: *Mohawk Productions, 125 Mayro Building, Utica, N. Y.*

♦ During the 1952 summer session at Iowa State College, Ames, Iowa, arrangements are being made for a driver education workshop and

(Continued on next page)

TEACHING MATERIALS

(Continued from page 32A)

Industrial Safety Guide, $1.15
Industrial Data Sheets, Index

New Jersey Department of Labor and Industry
Bureau of Engineering and Safety
Trenton, N. J.
Safety Education, 5¢
Woodworking Rules and Regulations, 5¢

Nicholson File Company
Providence 1, R. I.
File Filosophy
Ten Special File Types
Nicholson and X.F. Swiss Pattern Files, Cat. No. 9

Northeastern Lumber Manufacturers Association
271 Madison Avenue
New York 16, N. Y.
Serving the Nation's Greatest Lumber Consuming Market

Oliver Machinery Company
1025 Clancy Avenue, N. E.
Grand Rapids 2, Mich.
Woodworking Machinery Bulletin

Pittsburgh Plate Glass Company
632 Duquesne Way
Pittsburgh 22, Pa.
Color Dynamics, The Scientific Utilization of the Energy in Color

Plumb, Inc., Fayette R.
4837 James Street
Philadelphia 37, Pa.
Plumb Tool Catalog

Porter-Cable Machine Company, The
1714 North Salina Street
Syracuse 8, N. Y.
General Equipment Catalog

Queen City Machine Tool Company
217–19–21 East Second Street
Cincinnati 2, Ohio
Queen City Ball Bearing Grinders

Rogers Isinglass and Glue Company
Gloucester, Mass.
Facts You Should Know
The Rogers Book of Woodworking Shop Notes
A Brief History of Fish Glue
A Set of Project Sheets (Classification)

Savogran Company, The
25 Huntington Avenue
Boston 16, Mass.
You Can Do 1001 Things with Savogran Crack Filler and Wood Putty
How to Remove Paints, Varnishes, Enamels, etc.

Sheldon Machine Company, Inc.
4258 North Knox Avenue
Chicago 41, Ill.
General Catalog of Equipment

Sheldon & Company, E. H.
Muskegon, Mich.
Sheldon School Shop Equipment and Shop Plans

Simonds Abrasive Company
Tacony and Fraley Streets
Philadelphia 37, Pa.
Grinding Wheel Data Book

Skilsaw, Inc.
5033 North Elston Avenue
Chicago 30, Ill.
Skil Tools and Accessories Catalog

Southern Hardwood Producers, Inc.
805 Sterick Building
Memphis 3, Tenn.
Southern Oak
The A-B-C's of Gum
Southern Pecan
The Southern Hardwoods

(Continued on next page)

NEWS NOTES

(Continued from previous page)

also a seminar in driving. Full graduate credit may be obtained for these courses. Write for details.

♦ Four universities will co-operate this summer in a program to encourage better teaching of family financial security in the nation's high schools and colleges.

The four universities — Pennsylvania, Wisconsin, Connecticut, and Southern Methodist — will all hold these "workshops" to be attended by high school teachers, administrators, and faculty members of teacher training institutions, who will be recipients of scholarships awarded by the sponsoring universities. One of the purposes of the program will be to develop materials which these and other teachers throughout the United States can use to teach their students the fundamental principles of managing their incomes and saving money.

The workshop in Philadelphia will run from June 30 through August 9 and will be held in the University's new Wharton School Building. Six semester hours of credit will be awarded. Scholarships to this workshop will include first-class rail transportation to and from Philadelphia and tuition charges. Teachers will pay for their own board and room.

Dates for the workshop at the University of Wisconsin, at Madison, will be from June 30 through August 22 and six semester hours will be awarded. Scholarships of $100 each, sufficient to cover the cost of tuition and rooms, will be awarded to those attending the workshop. Teachers will pay for their meals. Participants will be drawn chiefly from the North Central States.

The workshop to be held at Southern Methodist University will serve chiefly the South West United States. Scholarships will include room and board for the duration of the course, from July 14 to August 8. Teachers will pay a tuition fee of $40. Four semester hours will be awarded for successful completion of the workshop at S.M.U.

The workshop at the University of Connecticut, which will serve the New England States, will run from August 4 to August 22 and four semester hours will be awarded. Scholarships will meet the costs of board and room for the students during their stay at Storrs. Participants will pay a tuition fee of $40.

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GENERAL ELECTRIC

TEACHING MATERIALS

(Continued from previous page)

Southern Pine Association
Canal Building
New Orleans 4, La.
The Way to Build the House to Last
Lumber and Millwork
Ten Lessons in Forestry
Forty Years of Southern Forestry
American Southern Pine

Southern Pulpwood Conservation Association
1506 First National Bank Building
Atlanta 3, Ga.
Forest Fires — The South's Greatest Enemy
How to Make the Most Money from Your Trees
The Pulp and Paper Industry of the South Looks Ahead
Where Does Our Timber Go?
Cutting Woodlands
Using Our Tree Crop Wisely

Stanley Tools
New Britain, Conn.
Tool Guide, 25¢
How to Work with Tools and Wood, $1
Catalog No. 34
"Yankee" Tool Book
Expert Soldering
Steel Square Booklet
No. 68 Electric Tool Catalog
"Fluid Lite" Eye Shield Folder
No. 610 Router-Shaper Catalog

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Union Bag and Paper Corporation
Woolworth Building
New York 17, N. Y.
Pulpwood, Key to Sustained Forest Income

United States Department of Agriculture
Forest Service
Washington 25, D. C.
The Work of the United States Forest Service, No. MP-290, 10¢
Our Forests, What They Are and What They Mean to Us, No. MP-162, 5¢
Living and Forest Lands, No. MP-388, 10¢
Forestry for 4-H Clubs MP-395, 10¢
Some Plain Facts About the Forests, No. MP-543, 10¢
Water and Our Forests, No. MP-600, 10¢
Managing the Small Forest, FB-1989, 20¢
You and Forest Fires, No. G-7
Know Your Water Sheds, No. L-282
Trees of Eastern United States, 16 Species, No. TDS-E
Trees of Southern United States, 16 Species, No. TDS-S
Trees of Western United States, 10 Species, No. TDS-W
The Well-Kept Farm Woods, A Teaching Outline, No. O-31
All Aboard the Forestry Special, No. K-1
Care of Trees — How to Revive Feeble or Weak Trees, No. K-3
Christmas Trees, No. K-4
Edible Fruits of Forest Trees, No. K-6

(Continued on page 38A)

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WOODWORKING

(1) INDUSTRIAL ARTS WOODWORKING
Adoptions and endorsements from all sections of the nation show this outstanding on woodworking. Step-by-step procedures from cutting out the rough stock to finishing the project. Four major parts for convenient use: (1) Fundamental processes. (2) Basic machine tools. (3) Wood and wood products . . . woodworking opportunities. (4) "Different" projects. *By John L. Feirer* $3.88

(2) WOODWORKING WORKBOOK
Combines practical "activity" principles of a workbook with informative material of a textbook. Grades 7 & 8. *By Nichols & Stiles* ..... 76 cents

(3) COLORING, FINISHING, and PAINTING WOOD
By Adnah C. Newell $6.00

(4) THE ART OF WOOD TURNING
By William W. Klenke $2.85

DRAWING

(5) MECHANICAL DRAWING PROBLEMS
Teaches by EXAMPLE . . . includes pencil technique, use of equipment, picture drawings, projection, working drawings, pattern development and machine drafting. Grouped for progressive learning in 2 year high school course. *By Edward Berg & Emil F. Kronquist* $2.36

(6) BEGINNING MECHANICAL DRAWING
One of the best organized and easiest-to-work textbooks for beginners on the market. Organized on information-operation plan. *By William B. Roberts* $1.48

(7) BEGINNING PROBLEMS IN MECHANICAL DRAWING
This book has no superior for establishing beginners on a sound, progressive basis. All drawings and dimensions are examples of excellent technique. *By Bennett* ..... 96 cents

(8) LEARNING TO READ MECHANICAL DRAWING
A method for rapid, economical teaching of fundamentals, using simplest equipment. How to read blueprints & shop drawings . . . training in orthographic, oblique, isometric, & perspective. *By Bartholomew & Orr* ..... 88 cents

(9) PROBLEMS IN BLUEPRINT READING
The original fast-action manual-workbook. Takes learner into advanced blueprint reading, ready for work in the trades. Widely used. *By Drew W. Castle* $1.60

GRAPHIC ARTS

(10) PRACTICE OF PRINTING
Widely considered the leader. Covers every standard printing practice from job layout to the finished product. Emphasizes correct procedures and judgement. Investigates all branches of the trade, including lithography, simplified for school use. Handset by the author. *By Ralph W. Polk* $2.88

(11) ELEMENTARY PRINTING JOB SHEETS
Over 50 selected & tested jobs covering the first year's work with PRACTICE OF PRINTING. Includes suggestions for use, outline for work and student's rating sheet. *By Polk* $1.20

(12) ELEMENTARY PLATEN PRESSWORK
All basic functions . . . all types of presses. Thorough development. Handset by the author. 140 photos & drawings . . . sample forms & type examples. *By Polk* $2.48

(13) JUNIOR PRINTING
For junior high level. Gives tests, examples of typography, layout & design. Illustrated with photos, drawings & designs. Thoroughly tested. *By Clifford K. Lush* $1.20

COMING!
(14) EXPLORING AUTOMECHANICS, By Glenn
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METALWORKING

(15) SHEET METAL PATTERN DRAFTING & SHOP PROBLEMS
No other contains so many typical problems easy to apply to trade conditions. Each illustrated with photo of finished form, full page detail drawing of development and step-by-step instructions. *By James H. Daugherty* $2.48

(16) MODERN METALCRAFT
33 attractive new projects with complete treatment of processes in art metalwork. Includes photos of finished articles and all steps in making. *By John L. Feirer* $3.48

(17) BASIC BENCH-METAL PRACTICE
By Giachino and Feirer $3.24

VOCATIONAL BOOKS

(18) TAILORING SUITS THE PROFESSIONAL WAY
New! Cutting, Sewing and stitching men's tailored suits and women's skirts. Hundreds of photos & drawings show each step as well as finished coat, vest, trousers, skirt, etc. *By Clarence Poulin* $4.50

(19) ART OF BRICKLAYING
Step-by-step coverage. Includes tools, mortars, brick and scaffolding. 42 bond patterns . . . skill jobs . . . cement block work. Glossary of trade terms. Illustrated. *By J. Edgar Ray* $4.00

(20) OXY-ACETYLENE WELDING & CUTTING
By J. W. Giachino $3.50

GENERAL SHOP

(21) GENERAL SHOP HANDBOOK
This famous economical text covers a complete general course. Each unit includes an illustrated list of tools, information details and operation procedures of fundamental nature. *By Willoughby and Chamberlain* .. $1.24

(22) ORGANIZING & TEACHING THE GENERAL SHOP
By Louis V. Newkirk $4.00

ELECTRICAL WORK

(23) INDUSTRIAL-ARTS ELECTRICITY
Full modern coverage presented in the right way for beginners. Just the right amount of information, simplified and properly organized. Many photos & drawings. *By Lush and Engle* $2.48

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New Publications

Forging and Forming Metals

By S. E. Rusinoff. Cloth, 279 pp., 5¾ by 8½ in., illus., $3.95. American Technical Society, Chicago 37, Ill.

An informative book on the forging of metal. The book starts out with the ancient method of forging and then goes on to describe power-hammer forging, drop forging, and press forging.

Heat-treatment of forging, inspection and testing of forgings, forging dies and tools, and the design of products that are to be forged, are covered.

The book also contains a glossary of forging terms and a chapter on standard practices and tolerances.

The book presents many fine illustrations describing the various operations and forging processes and machines.

Book Binding by Hand

By Laurence Town. Cloth, 281 pp., 5¾ by 8¾ in., illus., $4.50. Pitman Publishing Corp., New York City.

A book written by an expert craftsman and a teacher who loves the materials and tools with which he works. He is, therefore, interested more in hand binding than in machine binding.

The 22 chapters describe the tools and materials used, the various steps necessary in rebinding a book, the use and types of end papers, the styles to be taken in pasting and gluing up the different sections, rounding and backing, the preparation of making the boards, the treatment of the edges, head banding, covering, and pasting in the end papers.

The book also contains a selection of nine simple exercises for teaching the art of bookbinding.

Mandl's Television Servicing

By Matthew Mandl. Cloth, 421 pp., 6⅛ by 9¼ in., illus., $5. The Macmillan Co., New York 11, N. Y.

A textbook for those who are entering the television servicing field. The book presents the fundamentals of the use of the subject, the localizing of troubles and the use of the master index to television troubles.

It also explains the R.F. mixer-oscillator stages; the sound section; Video amplifiers, detectors, and restorers; Syne separator stages; vertical sweep

(Continued on page 38A)

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TEACHING MATERIALS

(Continued from page 36A)

Alaska's Forests, No. K–8
Highlights in the History of Forest Conservation, No. K–12
Making Paper from Trees, No. K–15
Logging and the Production of Lumber, No. K–16
List of State Trees, No. K–19
Uncle Billy's Speech — Can be used as a playlet to help teach conservation. Particularly adaptable to communities having acute conservation problems, No. K–25
Why Leaves Change Their Color, No. K–26
Wood — The Material of a Thousand Uses, No. K–27
Memorial Forests, No. O–5
National Forests and Field Offices of the Forest Service, No. O–8
Starting a Community Forest — Gives a plan for establishing a community forest, No. O–9
Schools Giving Courses Leading to a Degree of Forest — list, No. O–11
No Bum Steers — Range management cartoon folder, No. O–16
"Go To Grass" — Range management cartoon folder, No. O–21
What To Do When Lost in the Woods, No. O–23
How Our Forests Serve Us — Shows the importance of the forests in our daily lives, No. O–24
Enemies of the Forest, No. O–25
Forest of the Future, O–26
Forest and Wildlife, No. O–27
Forests and Water, No. O–28
Conservation Pledge — gives text of the pledge and offers suggestions for keeping it, No. O–35
Suggested Questions for Conservation Quiz — high school level, No. O–36
Ranger 'Rithmetic, a sixth grade Teaching Aid, No. O–40
Ranger 'Rithmetic, a seventh grade Teaching Aid, No. O–41
Forestry Co-Projects for Science, No. O–42

United States Department of Agriculture
Forest Service
Forest Products Laboratory
Madison 5, Wis.

A Hundred Definitions Pertaining to Wood and Other Forest Products, No. 240
Aluminum Coatings for Moisture Proofing Wood, No. 228
An Instrument for Measuring Wood Equilibrium Moisture Content, No. 239
A Method of Seasoning Small Quantities of Lumber, R1608
Analysis of Problems Relating to Uniformity of Kiln Control, R1645
Air Drying of Lumber, R1657
Average Strength and Related Properties of 5 Foreign Woods Tested at the Forest Products Laboratory, R1139
A Factory Method of Testing Hardness of Glue Joints, No. 233
A Water-Resistant Animal Glue, R–40
Animal Glues: Their Manufacture, Testing, and Preparation, D492
Adhesives for Bonding Wood to Metal
Bleaching Wood, 1950, No. 1705
Bending Solid Wood to Form, R1764
Boxing and Crating
Building Construction Subjects
Board Materials from Sawdust and Shavings

(To be continued)

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Kansas City, Missouri — 1004 Baltimore

NEW PUBLICATIONS

(Continued from page 36A)

systems — vertical and horizontal; power supplies, repairing and improving antenna systems; projection television; and VHF-UHF servicing factors.

The book also contains a section on color receiver servicing equipment.

Leather Tooling and Carving Patterns

By Chris H. Groneman. Packet containing 11 25 by 38-in. sheets of patterns, $2.50. International Textbook Co., Scranton 9, Pa.

This kit, based on the author's book on "Leather Tooling and Carving," contains 45 leatherworking patterns, 21 of which are originals chosen from the author's book, and 20 of which are supplementary designs. Then there are five modern designs. All of these designs are accompanied by bills of materials, and illustrations of the finished projects.

The kit will help many beginners who experience a decided letdown when they attempt the designing of their first major piece of leatherwork.

Shop Sketching and Blue Print Reading Made Easy

By J. T. Hayes and H. W. Paine. Spiral binding, 9¾ by 11 in., 154 pp. Technology Text Book Co., College Hill Station, P.O. Box 68, Cincinnati 24, Ohio.

This is the third revision of this text based on the idea that shop sketching and blueprint reading should be taught through practical problems in connection with explanatory technical material.

The text contains fifty lessons which cover (1) Shop Sketching and Blue Print Reading, (2) Advanced Sketching and Blue Print Reading, (3) Welding Conventions and Specifications, and (4) an appendix of reference materials, record chart, blank answer slips, and removable answer book pages.

The Wood Turning Lathe

By Ray E. Haines, John V. Adams, John G. Miller, Robert L. Thompson, and Raymond Van Tassel. Cloth, 132 pp., 7⅝ by 10¼ in., illus., $2.95. D. Van Nostrand Co., Inc., New York, N. Y.

An excellent text for school or home workshop. It explains all of the important methods of how to use the lathe and the lathe tools, how to turn spirals and spheres, and how to do oval turning, chuck turning, faceplate turning, and metal spinning.

(Continued on page 40A)

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by J. R. EATON

Written simply enough to be understood by anyone who can add and subtract, this book explains the principles, construction, and operation of the basic electrical devices and appliances, While the mechanical arrangement of parts and the operation of each device are described, emphasis is on basic principles. The book provides a thorough foundation in electricity for those preparing for the electrical trades. The author has been conducting extension courses, centering out of Purdue University, given to numerous groups being trained for maintenance and service work on the electronic and electrical installations now increasingly used throughout industry.

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Shaper Operations
Milling Machine Operations

Well organized for shop courses taught either on the production or the project plan, these books show, step by step, how to perform each operation on each tool. The necessary technical data and calculations are given at the points where they are used. There are many clear, detailed illustrations in each manual.

Direct Current Motor Manual *by H. S. Dusenbery*

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Full, up-to-date instruction on the electrical principles, construction and maintenance of d-c motors, generators, and their modern electronic control equipment.

Practical Marine Electricity *by S. N. LeCount & H. S. Dusenbery*

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Motor Tune-Up Manual *by R. J. Everest*

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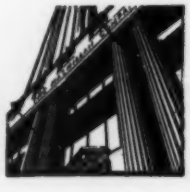

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NEW PUBLICATIONS

(Continued from page 38A)

It also describes 30 fine projects that can be made on the lathe.

Build-it-Yourself Ranch-Type House

By Tom Riley. Paper cover, spiral binding, 132 pp., 11 by 8½ in., illus., $3.50. Popular Mechanics Press, Chicago, Ill.

An excellently illustrated book on a beautiful home that was built by an amateur. What he accomplished can be done by others if they but follow the step-by-step directions, the clear halftones, the fine line cuts and diagrams, and the full color illustrations which make up this provocative and helpful book.

Basic Blueprint Reading and Sketching

By C. Thomas Olivo and Albert V. Payne. Loose-leaf, spiral binding, 145 pp., 8 by 10 in., $1.90. Delmar Publishers, Inc., Albany, N. Y.

A good text for the beginner. It consists of five sections, the first of which consists of five units explaining the different lines used on drawings. The second section, consisting of five units, explains the various views used by the draftsman. The third section, 11 units, introduces the student to dimensioning and the making of notes. Section IV, two units, shows the student how to draw sections. Section V, 10 units, is devoted to sketching, lettering, and the making of orthographic, oblique, isometric, and perspective sketches.

Repairing and Constructing Farm Buildings

By J. C. Wooley. Cloth, 261 pp., 6¼ by 9¼ in., illus., $3.20. McGraw-Hill Book Co., Inc., New York, N. Y.

A worth-while book for farmers, agricultural students, and carpenters working in rural areas.

Part I of the book deals with the repairing of farm buildings. Many of the suggestions made are based on a thorough study of the reasons which make the repairs necessary. The advice given is clearly stated and well illustrated so that even the semiskilled worker will have little trouble in making the repairs.

The repairs discussed pertain to roofs, foundations, basement walls, floors, barn frames, windows and doors, insulating and ventilating old buildings, and repairing silos.

Part II deals with the construction of farm buildings, and discusses the use of lumber, concrete, wood preservatives, paint, and the like.

How Children Learn About Human Rights

By Wilhelmina Hill and Helen K. Mackintosh. Office of Education Bulletin 1951, No. 9. 16 pp., 15 cents. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

This is another in a series of bulletins on the place of subjects in the elementary school curriculum. The over-all publication, *The Place of Subjects in the Curriculum,* Office of Education Bulletin 1949, No. 12 (15 cents), showed how subject matter is introduced into the program in a modern school. As a follow-up, a series of bulletins has been planned with three in that series now completed. They are *How Children Learn to Think,* Office of Education Bulletin 1951, No. 10 (15 cents), *How Children Use Arithmetic,* Office of Education Bulletin 1951, No. 7 (15 cents), and *How Children Learn About Human Rights.*

The Science of Precision Measurement

By The DoAll Company, Des Plaines, Ill. Paper cover, 256 pp., 5 15/16 by 8 15/16 in., illus., $3.50.

This book, in its seven chapters, presents the progress made in refining measurements from early Egyptian days down to the present time when science and industry are just barely satisfied to measure to the nearest millionth of an inch.

Chapter 1 presents a very interesting historical résumé of the standardization of various units of measurement.

Other chapters discuss the terms clearance and tolerance, dimensional quality control, the sine bar and its uses, optical flats, electric comparators, and statistical systems of quality control.

Manual for Chevrolet Owners

By C. E. Packer. Cloth, 304 pp., 6 by 8¾ in., illus., $3.50. Popular Mechanics Co., 200 East Ontario St., Chicago 11, Ill.

A very helpful book for Chevrolet owners. It will help them understand their car and assists them in making economical repairs. It also calls attention to many things which presage future troubles and tells what to do about them.

The book explains how each part of the car works and how to make the tests that show where and what must be done to put the car in good running order.

Education Directory 1951–52 — Part 3, Higher Education

By Theresa Wilkins, Office of Education. 184 pp. 1952. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., 45 cents.

Listed in this directory are 1859 institutions of higher education reported to the Office of Education as being in operation during 1950–51, offering at least a 2-year program of college-level studies.

The *Education Directory* is issued annually in four parts: (1) Federal Government and States; (2) Counties and Cities; (3) Higher Education; and (4) Education Associations. Parts 1, 2, and 4 are still in preparation.

Fire Tests of Wood-Framed Walls and Partitions With Asbestos-Cement Facings

By Nolan D. Mitchell, National Bureau of Standards Building Materials and Structures Report 123, iv, 14 pp., 2 tables, 12 figures and half-tone illustrations, 15 cents (order from Government Printing Office, Washington 25, D. C.).

Fire resistance data on asbestos-cement shingles and wall facings become increasingly significant as the demand grows for low- or moderate-cost constructions. This book provides information derived from recent tests. It will help in evaluating the fire-resistive characteristics of wood-stud walls and partitions having facings of asbestos-cement and will give the prospective builder a basis for the selection of constructions to meet given fire-resistance requirements.

Control and Removal of Radioactive Contamination in Laboratories

National Bureau of Standards Handbook 48, 24 pp., 15 cents (order from Government Printing Office, Washington 25, D. C.).

This handbook gives detailed information on laboratory procedures designed to minimize the possibility of any accident involving radioactivity and to minimize the effects if such accidents do occur. As part of the program of the National Committee on Radiation Protection for establishment of radiation safety procedures, the handbook was prepared by the Subcommittee on Waste Disposal and Decontamination.

Aluminum Structural Design

Spiral binding, 124 pp., 6 by 8¾ in.

Aluminum Powders and Pastes

Spiral binding, 84 pp., 6 by 8¾ in.

Finishes for Aluminum

Spiral binding, 124 pp., 6 by 8¾ in.

Published by the Reynolds Metals Co., 2500 South Third St., Louisville 1, Ky.

The three manuals enumerated above are products of the Technical Editorial Service of the Reynolds firm. They are fine examples of bookmaking, printing, and illustrating. The material which they contain is of high technical value.

The one on structural design discusses the various aluminum alloys and their mechanical properties. Then it describes the structural and fabricating considerations.

The book on aluminum powders and pastes presents their development and how they are produced at the present time. It also describes the various purposes for which they are used and gives directions for safely handling and storing them.

The aluminum finishing manual describes how aluminum is to be cleaned for the different types of finishes and then explains the various finishes that may be used.

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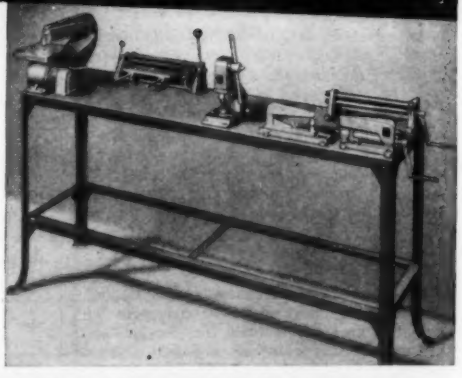

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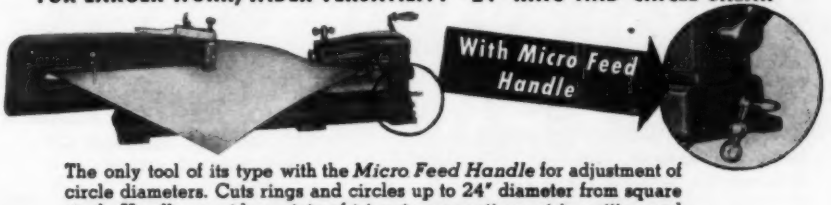

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SHOP EQUIPMENT NEWS

STANLEY TOY PATTERNS

Stanley Tools announces two new sets of Six Toy Patterns, P1 and P2, for school shop instructors. Each set has six patterns printed on 11 by 17-inch pages, complete with helpful hints for constructing, assembling, and finishing. Instructions are easy to follow and the patterns are especially suited to beginning woodworkers.

Two new sets of toy patterns

Pattern outline can be traced directly on the wood by use of carbon paper, or patterns may be cut out and mounted on cardboard to be used as templates. The two sets of patterns include a number of fascinating action toys that make delightful gifts for children. The toys pictured by the P1 Patterns include fighting roosters, tumbling clown, paddle wheel boat, noise-making clacker, and a cradle. The P2 Patterns feature a marble game, propeller toy, spinning clown, periscope, wren birdhouse, and a dump wagon. Retail price 25 cents per set.

For further information write to *Stanley Tools, New Britain, Conn.*

For brief reference use IAVE — 0501.

WELLER ANNOUNCES NEW ECONOMY PRICES ON ALL MODELS OF SOLDERING GUNS

Those instant-heating, easy-to-handle Weller Soldering Guns have been reduced 20 to 25 per cent in price.

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Weller soldering guns

For further information about the Weller Soldering Guns write to *Weller Electric Corp., Easton, Pa.*

For brief reference use IAVE — 0502.

NEW "BLU-MOL" HIGH-SPEED, HEAVY-DUTY FOLLOW-THROUGH TYPE HOLE SAWS

Under the brand name "Blu-Mol," the Millers Falls Company has recently introduced a new line of high-speed, heavy-duty, follow-through type hole saws in sizes up to 4½ in. in diameter.

Using a specially selected high-speed steel edge welded to an extremely tough alloy steel back, these rugged gang cutting tools are practically unbreakable in use and are capable of fast, clean cutting in any machinable material such as hard and mild steels, aluminum, brass and bronze, iron and steel pipes, plastics, etc.

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(Continued on page 44A)

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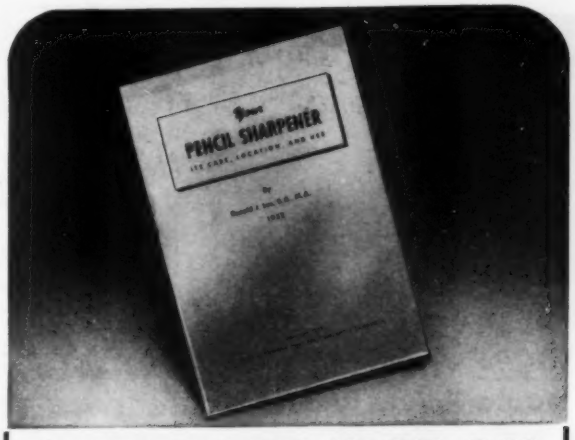

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SHOP EQUIPMENT NEWS

(Continued from page 42A)

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For brief reference use IAVE — 0503.

NEW MIDGET PLIER-SNIP BY UTICA

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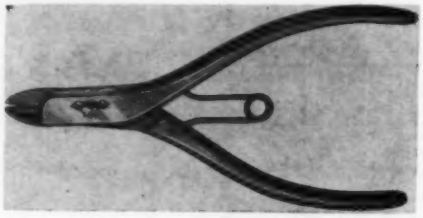

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For further information write to *Utica Drop Forge and Tool Corp., Utica 4, N. Y.*

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(Continued on page 46A)

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SHOP EQUIPMENT NEWS

(Continued from page 44A)

as well as cosmic and X-rays. Radiation from uranium, pitchblende, radium, and other radioactive sources are instantly indicated by clicks in the headphones and by flashes of neon bulb which increase markedly in frequency as radioactive source is approached.

Lightweight (3 lb.), the "Super Scout" has a sturdy leather handle plus a belt clip for convenient carrying. It is supplied with tubes, parts, batteries, etc. Any 2000-ohm headphones may be used for audible detection. Easy-to-read instructions including a picture type diagram are included. Case size is 7¾ by 4⅜ by 2¼ in.

The "Super Scout" kit is available from *Allied Radio Corp., 833 West Jackson Blvd., Chicago 7, Ill.*

For brief reference use IAVE — 0505.

DURO METAL 18-IN. DRILL PRESS

The redesigned and improved 18-in. drill press shown herewith has been announced by the Duro Metal Products Company of Chicago. This drill incorporates many new features and advantages, which increase the capacity and the ruggedness of the power tool. It will perform a wide variety of drilling and tapping jobs, and is available in

Duro Metal Products Company 18-in. Drill

two styles. A few of the major improvements include: precision ground alloy steel spindle with increased diameter, permanently lubricated ball bearings sealed to safeguard against grit and dust, and precision bored bearing seats that provide perfect alignment. It also is provided with a head casting to eliminate vibration, has a depth stop, and a sturdy cast hinged belt and pulley guard. The motor mount can be readily adjusted, and it has an adjustable feed tension with pin for positive positioning. A heavy cast iron column bracket with locking mechanism supports the precision ground tilting production table.

Specifications: ¼-in. capacity in cast iron;

(Continued on page 48A)

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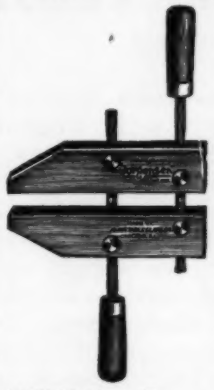

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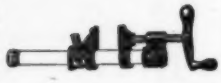

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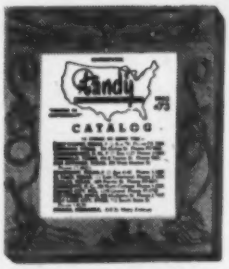

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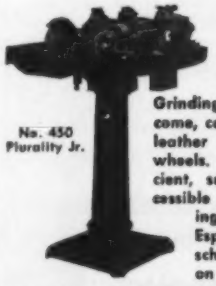

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SHOP EQUIPMENT NEWS

(Continued from page 46A)

spindle has No. 2 Morse taper; speed range 450 to 1965 r.p.m.; spindle travel 5 in.; base to spindle 44½ in.; table to spindle 20 in.; overall height 69 in.; 3½-in. column; table surface 14 by 18 in.; base surface 12 by 12 in.; overall base 18 by 28 in.; weight of model illustrated 350 lb. less motor. Also available *without* foot feed or *with* production type base.

For additional details write to *Duro Metal Products Co., 2681 N. Kildare Ave., Chicago 39, Ill.*

For brief reference use IAVE — 0506.

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This book of woodworking plans for the home shop contains original projects designed especially for the home craftsman by commercial furniture designers.

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Each project is presented by a dimensioned drawing, an easy step-by-step building procedure, and a complete list of materials. The book also contains information on gluing, joinery, drawer construction, and wood finishing.

To order, send 50 cents to *Atlas Press Co., 2571 North Pitcher St., Kalamazoo, Mich.*

For brief reference use IAVE — 0507.

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Safety "Know-How" in the woodshop impresses students with the advantages of careful conduct in the shop. It emphasizes the need for care in handling and sharpening hand tools as well as the necessity for proper lighting and the importance of recognizing fire hazards and being able to administer first aid.

Fifty-five frames cover the subject in detail. Publishers of this film strip are the *Chas. A. Bennett Co., Inc., formerly The Manual Arts Press, of Peoria, Ill.*

For brief reference use IAVE — 0508.

AXONOMETRIC DRAWING

John R. Cassell Co., Inc., have published a booklet titled "Axonometric Drawing" which shows clearly how to make dimetric, isometric, and trimetric, one-view drawings.

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(Continued on page 50A)

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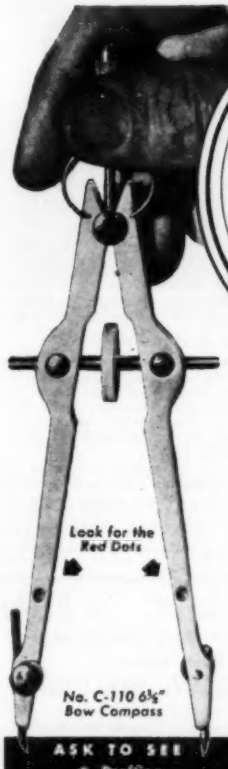

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SHOP EQUIPMENT NEWS

(Continued from page 48A)

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For brief reference use IAVE — 0509.

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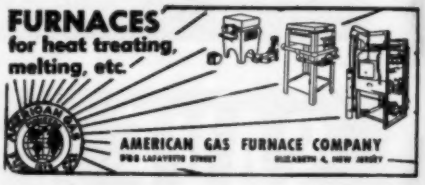
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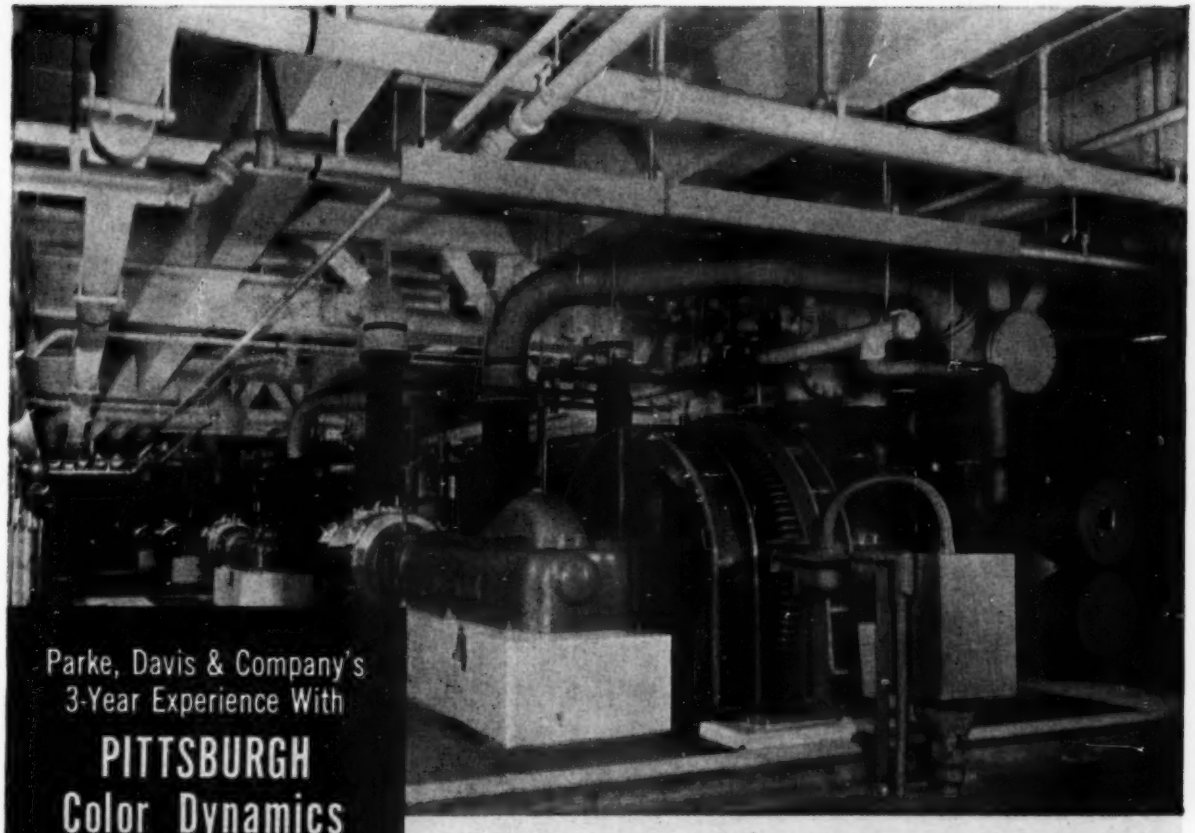

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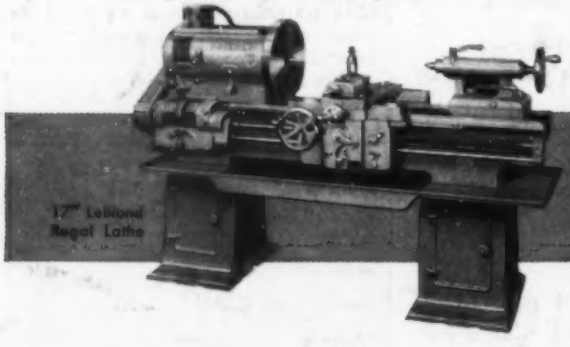

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